



WALKER
RESTORATION CONSULTANTS

PROJECT MANUAL & SPECIFICATIONS

**STATE OF MAINE
PARKING GARAGE
RESTORATION - 2014
AUGUSTA, MAINE**

STATE PROJECT #1803

PREPARED FOR:
STATE OF MAINE
BUREAU OF GENERAL SERVICES
AUGUSTA, MAINE

ISSUED FOR BIDS & CONSTRUCTION
AUGUST 7, 2014

PRE-BID CONFERENCE

A pre-bid conference will be held on Tuesday August 12th, 2014 at 10:00 a.m. at the parking garage at 93 Sewall St, Augusta, Maine. Bidders shall meet at the southeast corner of the garage which is on Capital Street. A brief field review of the garage will follow.

WALKER PROJECT 16-2559.00

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00 11 13
Notice to Contractors

State of Maine Parking Garage Restoration - 2014
Augusta, Maine.
State Project PT#1803

The State of Maine Parking Garage Restoration – 2014 Project # 1803 consists of restoration work to be performed on this three level post-tensioned parking structure. Specific work shall include but not be limited to the following: concrete repairs to the delaminated and scaled floor areas and soffit, concrete column repairs, epoxy injection of column cracks, column top waterproofing, fabrication and installation of structural angles at post-tension tendon repair locations, re-application of traffic topping waterproofing membrane and sealants to designated floor areas, application of penetrating concrete sealer to designated floor areas, remove and replace floor joint sealant at designated floor areas, expansion joint seal replacement at designated stairtower areas, and other miscellaneous maintenance work to complete the project. Alternate work items included for bidding this project consists of cleaning and sealing of the façade on all elevations and levels of this structure.

The cost of the work is approximately \$ 390,000. The work to be performed under this contract shall be completed on or before *November 1, 2014*.

1. Sealed Contractor bids for the project noted above, in envelopes plainly marked "Bid for *State Of Maine Parking Garage Restoration - 2014 Augusta, Maine* " and addressed to:

MaryBeth VanKeuren, P.E., Project Manager
Bureau of General Services
4th Floor, Cross State Office Building, 111 Sewall Street
77 State House Station
Augusta, Maine 04333-0077

will be opened and read aloud at the address shown above at **2:00 p.m.** on **August 26th 2014**. Bids submitted after the noted time will not be considered and will be returned unopened.

2. The bid shall be submitted on the Contractor Bid Form (section 00 41 13) provided in the Bid Documents. The Owner reserves the right to accept or reject any or all bids as may best serve the interest of the Owner.
3. Bid security *is required* on this project.
The Bidder shall include a satisfactory Bid Bond (section 00 43 13) or a certified or cashier's check for 5% of the bid amount with the completed bid form submitted to the Owner.
4. Performance and Payment Bonds *are required* on this project.
The selected Contractor shall furnish a 100% contract Performance Bond (section 00 61 13.13) and a 100% contract Payment Bond (section 00 61 13.16) in the contract amount to cover the execution of the Work.
5. Filed Sub-bids *are not required* on this project.
6. There *are no* Pre-qualified General Contractors on this project.

00 11 13
Notice to Contractors

7. An on-site pre-bid conference *will* be conducted for this project. The pre-bid conference is *mandatory* for General Contractors and optional for Subcontractors and suppliers. Contractors who arrive late or leave the meeting early may be prohibited from participating in this meeting and bidding. *Pre-bid conference will be held on Tuesday August 12th, 2014 at 10:00 a.m. at the parking garage at 93 Sewall St, Augusta, Maine. Bidders shall met at the southeast corner of the garage which is on Capital Street. A brief field review of the garage will follow.*
8. Bid Documents will be available on or about *August 7, 2014* and may be downloaded *from the BGS website: http://www.maine.gov/bgs/constrpublic/contractors/ge_rfp.htm*

The bidder is responsible for checking the BGS web site periodically for addenda. The final addendum will be posted no later than 72 hours prior to the bid opening.

9. Bid Documents may be examined at:

*AGC Maine
188 Whitten Road
Augusta, ME 04332
Phone 207-622-4741 Fax 207-622-1625*

*Construction Summary
734 Chestnut Street
Manchester, NH 03104
Phone 603-627-8856 Fax 603-627-4524*

00 21 13
Instructions to Bidders

1. Bidder Requirements

- 1.1 A bidder is a Contractor who is qualified, or has been specifically pre-qualified by the Bureau of General Services, to bid on the proposed project described in the Bid Documents.
- 1.2 Contractors and Subcontractors bidding on projects that utilize Filed Sub-bids shall follow the requirements outlined in these Bid Documents for such projects. See Section 00 22 13 for additional information.
- 1.3 Contractors are not eligible to bid on the project when their access to project design documents prior to the bid period distribution of documents creates an unfair bidding advantage. Prohibited access includes consultation with the Owner or with design professionals engaged by the Owner regarding cost estimating, constructability review, or project scheduling. This prohibition to bid applies to open, competitive bidding or pre-qualified contractor bidding or Filed Sub-bidding. The Bureau may require additional information to determine if the activities of a Contractor constitute an unfair bidding advantage.
- 1.4 Each bidder is responsible for becoming thoroughly familiar with the Bid Documents prior to submitting a bid. The failure of a bidder to review evident site conditions, to attend available pre-bid conferences, or to receive, examine, or act on addenda to the Bid Documents shall not relieve that bidder from any obligation with respect to their bid or the execution of the work as a Contractor.
- 1.5 Prior to the award of the contract, General Contractor bidders or Filed Sub-bidders may be required to provide documented evidence to the Owner or the Bureau showing compliance with the provisions of this section, their business experience, financial capability, or performance on previous projects.
- 1.6 The selected General Contractor bidder will be required to provide proof of insurance before a contract can be executed.
- 1.7 Contracts developed from this bid shall not be assigned, sublet or transferred without the written consent of the Owner.

2. Authority of Owner

- 2.1 The Owner reserves the right to accept or reject any or all bids as may best serve the interest of the Owner.
- 2.2 Subject to the Owner's stated right to accept or reject any or all bids, the Contractor shall be selected on the basis of the sum of the lowest acceptable bid plus any Alternate Bids the Owner elects to include.
- 2.3 The Owner is exempt from the payment of Federal Excise Taxes and Federal Transportation Tax on all shipments, as well as Maine State Sales and Use Taxes on items "...physically incorporated in real property ...". The bidder shall not include these taxes in their bid. See Section 00 72 13 for additional information.

00 21 13
Instructions to Bidders

3. Submitting Bids and Bid Requirements

- 3.1 Each bid shall be submitted on the forms provided in the Bid Documents.
- 3.2 Each bid shall be valid for a period of thirty calendar days following the Project bid opening date and time.
- 3.3 A bid that contains an escalation clause is considered invalid.
- 3.4 Bidders shall include a Bid Bond or other approved bid security with the bid form submitted to the Owner when the bid form indicates such bid security is required. The bond value shall be 5% of the bid amount. The form of bond is shown in section 00 43 13.
- 3.5 Bidders shall include the cost of Performance and Payment Bonds in the bid amount if the bid amount will result in a construction contract value over \$125,000, inclusive of alternate bids that may be awarded in the contract. Pursuant to 14 M.R.S.A., Section 871, Public Works Contractors' Surety Bond Law of 1971, subsection 3, the selected Contractor is required to provide these bonds before a contract can be executed. The form of bonds are shown in section 00 61 13.13 and 00 61 13.16.
- 3.6 Bidders may modify bids in writing prior to the bid closing time. Such written amendments shall not disclose the amount of the initial bid. If so disclosed, the entire bid is considered invalid.
- 3.7 Bidders shall acknowledge on the bid form all Addenda issued in a timely manner. The Architect shall not issue Addenda affecting bidders less than 72 hours prior to the bid closing time. Addenda shall be issued to all companies who are registered holders of Bid Documents.
- 3.8 A bid may be withdrawn without penalty if a written request by the bidder is presented to the Owner prior to the bid closing time. Such written withdrawal requests are subject to verification as required by the Bureau. After the bid closing time, such written withdrawal requests may be allowed in consideration of the bid bond or, without utilizing a bid bond, if the Contractor provides documented evidence to the satisfaction of the Bureau that factual errors had been made on the bid form.
- 3.9 Projects which require a State of Maine wage determination will include that schedule as part of the Bid Documents. See section 00 73 46, if such rates are required.
- 3.10 Projects which require compliance with the Davis-Bacon Act are subject to the regulations contained the Code for Federal Regulations and the federal wage determination which is made a part of the Bid Documents. See section 00 73 46, if such rates are required.

00 41 13
Contractor Bid Form

State of Maine Parking Garage Restoration- 2014
Augusta, Maine
State Project #1803

To: *Mary Beth Van Keuren, P.E., Project Manager*
Bureau of General Services
77 State House Station
Augusta, Maine 04333-0077

The undersigned, or "Bidder", having carefully examined the form of contract, general conditions, specifications and drawings dated August 4, 2014, prepared by Walker Restoration Consultants for State of Maine Parking Garage Restoration - 2014, as well as the premises and conditions relating to the work, proposes to furnish all labor, equipment and materials necessary for and reasonably incidental to the construction and completion of this project for the Base Bid amount of:

_____ Dollars

\$ _____

Allowances *are included* on this project.

1. Alternate bids *are included* on this project.

Bid Alternate #1 – Work item 90.1 (Clean Façade) Add \$ _____

Bid Alternate #2 - Work item 90.2 (Clean Stair Tower) Add \$ _____

Bid Alternate #3 - Work item 91.3 (Concrete Sealer) Add \$ _____

2. The Bidder acknowledges receipt of the following addenda to the specifications and drawings:

Addendum No. _____ Dated: _____

Addendum No. _____ Dated: _____

Addendum No. _____ Dated: _____

Addendum No. _____ Dated: _____

Addendum No. _____ Dated: _____

00 41 13
Contractor Bid Form

3. Bid security *is required* on this project.
The Bidder shall include a satisfactory Bid Bond (section 00 43 13) or a certified or cashier's check for 5% of the bid amount with this completed bid form submitted to the Owner.

4. Filed Sub-bids *are not required* on this project.
The bid amount includes the following Filed Sub-bids which were submitted to the Bidder and to the Maine Construction Bid Depository.

**00 41 13
Contractor Bid Form**

**STATE OF MAINE PARKING GARAGE RESTORATION - 2014
AUGUSTA, MAINE**

5. The Bidder agrees, if this bid is accepted by the Owner, to sign the designated Owner-Contractor contract and deliver it, with any and all bonds and affidavits of insurance specified in the Bid Documents, within twelve calendar days after the date of notification of such acceptance, except if the twelfth day falls on a State of Maine government holiday or other closure day, a Saturday, or a Sunday, in which case the aforementioned documents must be received before 12:00 noon on the day following the holiday or other closure day, Saturday or Sunday.

As a guarantee thereof, the Bidder submits, together with this bid, a bid bond or other acceptable instrument as and if required by the Bid Documents.

6. This bid is hereby submitted by:

Signature: _____

Printed name and title: _____

Company name: _____

Mailing address: _____

City, state, zip code: _____

Phone number: _____

Email address: _____

State of incorporation,
if a corporation: _____

List of all partners,
if a partnership: _____

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00 43 13
Contractor Bid Bond

We, the undersigned, insert company name of Contractor, select type of entity of insert name of municipality in the State of insert name of state as principal, and insert name of surety as Surety, are hereby held and firmly bound unto select title of obligee in the penal sum of five percent of the bid amount, for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns, signed this insert day, i.e.: 8th day of select month, select year, which is the same date as that of the bid due date.

The condition of the above obligation is such that whereas the principal has submitted to the Owner, or State of Maine, to a certain bid, attached hereto and hereby made a part hereof, to enter into a contract in writing, for the construction of State Of Maine Parking Garage Restoration- 2014

Augusta, Maine State Project #1803

Now therefore:

If said bid shall be rejected, or, in the alternate,

If said bid shall be accepted and the principal shall execute and deliver a contract in the form of contract attached hereto, properly completed in accordance with said bid, and shall furnish a bond for the faithful performance of said contract, and for the payment of all persons performing labor or furnishing material in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said bid, then this obligation shall be void.

Otherwise, the same shall remain in force and effect- it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received hereby stipulates and agrees that the obligation of said Surety and its bonds shall be in no way impaired or affected by any extension of the time within which the Obligee may accept such bid and said Surety does hereby waive notice of any such extension.

00 43 13
Contractor Bid Bond

In witness whereof, the principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set above.

Signed and sealed this insert day, i.e.: 8th day of select month, select year, which is the same date as that of the bid due date.

Contractor

(Signature)

insert name and title

insert company name

insert address
insert city state zip code

Surety

(Signature)

insert name and title

insert company name

insert address
insert city state zip code

If Contractor is a partnership, all partners shall execute the bond. A power of attorney document indicating that it still is in full force and effect shall be provided by the person executing this bond.

STATE OF MAINE
Bureau of General Services
CONSTRUCTION CONTRACT

THIS AGREEMENT made the date day of month in the year 2014 by and between the State of Maine through the Department name hereinafter called the *Owner* and Contractor company name hereinafter called the *Contractor*.

BGS Project No.: #1803

Other Project No.: Engineers Project # 16-2559.00

The *Owner* and the *Contractor* for the consideration hereinafter named agree as follows:

ARTICLE 1 SCOPE OF WORK

§ 1.1 The *Contractor* shall furnish all of the materials and perform all the work described in the specifications and shown on the drawings for the project entitled: State of Maine Parking Garage Restoration - 2014 Augusta, Maine.

§ 1.2 The specifications and the drawings have been prepared by Walker Restoration Consultants, acting as Designer and named in the documents as the Architect or Engineer. This firm has responsibilities for defining the scope of work governed by their agreement with the *Owner*, the specifications and the drawings, and the General Conditions and Special Provisions of the contract.

ARTICLE 2 COMPLETION DATE

§ 2.1 The work to be performed under this contract shall be completed on or before date. For each calendar day the project remains uncompleted \$0.00 shall be charged as liquidated damages.

ARTICLE 3 CONTRACT SUM

§ 3.1 The *Owner* shall pay the *Contractor* for the performance of the contract, subject to additions and deductions provided by approved Change Orders in current funds as follows: amount in words dollars and 00cents, \$0.00

ARTICLE 4 CONTRACT BONDS

§ 4.1 Contract bonds are not required if the contract amount is less than \$125,000 unless bonds are specifically mandated by the contract documents.

§ 4.2 On this project, the *Contractor* shall furnish the *Owner* the appropriate contract bonds in the amount of 100% of the contract amount.

ARTICLE 5 PROGRESS PAYMENTS

§ 5.1 The *Owner* shall make payments on account of the contract as provided therein as follows: Each month 95% of the value, based on contract prices of labor and materials incorporated in the work and of materials suitably stored at the site thereof up to the first day of that month, as certified by the Architect or Engineer.

§ 5.2 The *Owner* may cause the *Contractor* to be paid such portion of the amount retained hereunder as he deems advisable.

ARTICLE 6 FINAL PAYMENT

§ 6.1 Final payment shall be due 30 days after completion and acceptance of the work, provided the *Contractor* has submitted evidence satisfactory to the *Owner* that all payrolls, material bills and other indebtedness connected with the work has been paid.

ARTICLE 7 CONTRACT DOCUMENTS

§ 7.1 The General Conditions of the contract, instructions to bidders, bid form, Special Provisions, the written specifications and the drawings, and any Addenda, together with this agreement, form the contract; they are as fully a part of the contract as if hereto attached or herein repeated.

§ 7.2 Specifications: August 4, 2104

§ 7.3 Drawings: R-001 General Notes, Legends, and Work Item Schedule

R-101 Ground Level Plan

R-102 Second Level Plan

R-103 Top Level Plan

R-501 Repair Details

R-502 Repair Details

RG-101 Ground level Striping Plan

RG-102 Second Level Striping Plan

RG-103 Top Level Striping Plan

§ 7.4 Addenda: _____

ARTICLE 8 OTHER PROVISIONS

§ 8.1 The *Owner* and the *Contractor* are required to comply with applicable provisions of the American Recovery and Reinvestment Act (ARRA), and the Qualified School Construction Bonds (QSCB) program, including, but not limited to, the Buy American criteria, federal wage rates, and program-specific reporting requirements, for those projects funded through ARRA and QSCB.

The *Owner* and the *Contractor* hereby agree to the full performance of the covenants herein.

IN WITNESS WHEREOF the parties hereby execute this agreement the day and year first above written.

OWNER**CONTRACTOR**

_____ (Signature)	_____ (Date)	_____ (Signature)	_____ (Date)
_____ (Printed name and title)		_____ (Printed name and title)	
_____ (Department name)		_____ (Contractor company name)	

BUREAU OF GENERAL SERVICES

Contract Reviewed by:

Contract Approved by:

_____ (Signature)	_____ (Date)	_____ (Signature)	_____ (Date)
		Joseph Ostwald	
Project Manager/ Contract Administrator		Director, Planning, Design & Construction	

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00 61 13.13
Contractor Performance Bond

Bond No.: insert bond number

We, the undersigned, insert company name of Contractor, select type of entity of insert name of municipality in the State of insert name of state as principal, and insert name of surety as Surety, are hereby held and firmly bound unto select title of obligee in the penal sum of the Contract Price \$ insert the Contract Price in numbers for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

The condition of the above obligation is such that if the principal shall promptly and faithfully perform the contract entered into this insert day, i.e.: 8th day of select month, select year, which is the same date as that of the construction contract, for the construction of insert name of project as designated in the contract documents, then this obligation shall be null and void.

Otherwise, the same shall remain in force and effect- it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received hereby stipulates and agrees that the obligation of said Surety and its bonds shall be in no way impaired or affected by any extension of the time which the Obligee may accept during the performance of the contract and said Surety does hereby waive notice of any such extension.

00 61 13.13
Contractor Performance Bond

In witness whereof, the principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set above.

Signed and sealed this insert day, i.e.: 8th day of select month, select year, which is the same date as that of the construction contract.

Contractor

(Signature)

insert name and title

insert company name

insert address
insert city state zip code

Surety

(Signature)

insert name and title

insert company name

insert address
insert city state zip code

If Contractor is a partnership, all partners shall execute the bond. A power of attorney document indicating that it still is in full force and effect shall be provided by the person executing this bond.

00 61 13.16
Contractor Payment Bond

Bond No.: insert bond number

We, the undersigned, insert company name of Contractor, select type of entity of insert name of municipality in the State of insert name of state as principal, and insert name of surety as Surety, are hereby held and firmly bound unto select title of obligee in the penal sum of the Contract Price \$ insert the Contract Price in numbers for the use and benefit of claimants, defined as an entity having a contract with the principal or with a subcontractor of the principal for labor, materials, or both labor and materials, used or reasonably required for use in the performance of the contract, for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

The condition of the above obligation is such that if the principal shall promptly satisfy all claims and demands incurred for all labor and materials, used or required by the principal in connection with the work described in the contract entered into this insert day, i.e.: 8th day of select month, select year, which is the same date as that of the construction contract, for the construction of insert name of project as designated in the contract documents, and shall fully reimburse the obligee for all outlay and expense with said obligee may incur in making good any default of said principal, then this obligation shall be null and void.

Otherwise, the same shall remain in force and effect- it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received hereby stipulates and agrees that the obligation of said Surety and its bonds shall be in no way impaired or affected by any extension of the time which the Obligee may accept during the performance of the contract and said Surety does hereby waive notice of any such extension.

00 61 13.16
Contractor Payment Bond

In witness whereof, the principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set above.

Signed and sealed this insert day, i.e.: 8th day of select month, select year, which is the same date as that of the construction contract.

Contractor

(Signature)

insert name and title

insert company name

insert address

insert city state zip code

Surety

(Signature)

insert name and title

insert company name

insert address

insert city state zip code

If Contractor is a partnership, all partners shall execute the bond. A power of attorney document indicating that it still is in full force and effect shall be provided by the person executing this bond.

Construction Change Directive Form

[Project name]**[location]****[address]****[city state zip]****C. C. D. Number:****Date:**

Other Project Number:

BGS Project Number:To: **[Contractor company name]**

- > Fully describe the scope of work of the CCD item below and on attached drawings and specifications as necessary.
- > Include the reason for the work, and the estimated cost and schedule impact.
- > Final cost and time changes are subject to a subsequent Change Order review process.

No.**Description****Cost**

1 [Replace this text. Please describe the scope of the work completely. Indicate item number at left and cost at right. Repeat below for items as needed.]

Total: **\$0**

Current

Completion Date:

Method of compensation	
"X" in box at left	
<input type="checkbox"/>	lump sum (as shown above)
<input type="checkbox"/>	unit prices \$0 / [units]
<input type="checkbox"/>	cost plus designated percentage 0.00 %
<input type="checkbox"/>	cost plus fixed fee \$0 (fixed fee)

Extend Completion Date by
This Number of Days:

New Completion Date:

Architect/Engineer**[Firm name]****[address]****[city state zip]****Contractor****[Company name]****[address]****[city state zip]****Owner****[Agency name]****[address]****[city state zip]****[type name here - signature above]**

date:

[type name here - signature above]

date:

[type name here - signature above]

date:

> approved by:

Bureau of General Services

date:

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00 63 63
Change Order Form

[Project name] _____
[location] _____
[address] _____
[city state zip] _____

C. O. Number: _____

Date: _____

To: **[Contractor company name]** _____

Other Project Number: _____

BGS Project Number: _____

- > Number and briefly summarize each Change Order item below. Include description of and reason for work, and cost.
- > Attach appropriate supporting documentation including drawings and specifications.
- > Change Order is not valid until signed by all parties.

No.	Description	Cost
1	[Replace this text. Please keep the description brief so the text is completely visible when printed. Indicate item number at left and cost at right. Repeat below for items as needed.]	
Total:		\$0

	Add	Deduct	Total
Amount of This Change Order	\$0	\$0	
Amount of Previous Change Orders	\$0	\$0	
Net Change Orders to Date	\$0	\$0	\$0
Original Contract Amount			\$0
Contract Total to Date			\$0

Current

Completion Date: _____

Extend Completion Date by

This Number of Days: _____

New Completion Date: _____

Architect/Engineer

[Firm name] _____

[address] _____

[city state zip] _____

Contractor

[Company name] _____

[address] _____

[city state zip] _____

Owner

[Agency name] _____

[address] _____

[city state zip] _____

[type name here - signature above]

date: _____

[type name here - signature above]

date: _____

[type name here - signature above]

date: _____

> approved by: **Bureau of General Services** _____ date: _____

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00 71 00
Definitions

1. Definitions

- 1.1 *Addendum*: A document issued by the Architect that amends the Bid Documents. Addenda shall not be issued less than seventy-two hours prior to the specified bid opening time.
- 1.2 *Allowance*: A specified dollar amount for a particular scope of work or service included in the Work that is identified in the Bid Documents and included in each Bidder's Bid. The Contractor shall document expenditures for an Allowance during the Project. Any unused balance shall be credited to the Owner. The Contractor is responsible for notifying the Owner of anticipated expenses greater than the specified amount and the Owner is responsible for those additional expenses.
- 1.3 *Alternate Bid*: The Contractor's written offer of a specified dollar amount, submitted on the Bid Form, for the performance of a particular scope of work described in the Bid Documents. The Owner determines the low bidder based on the sum of the base Bid and any combination of Alternate Bids that the Owner selects.
- 1.4 *Architect*: The Architect or Engineer acting as Professional-of-Record for the project. The Architect is responsible for the design of the Project.
- 1.5 *Architectural Supplemental Instruction (ASI)*: A written instruction from the Architect for the purpose of clarification of the Contract Documents. An ASI does not alter the Contract Price or Contract Time. ASIs may be responses to RFIs and shall be issued by the Architect in a timely manner to avoid any negative impact on the Schedule of Work.
- 1.6 *Bid*: The Contractor's written offer of a specified dollar amount or amounts, submitted on a form included in the Bid Documents, for the performance of the Work. A Bid may include bonds or other requirements. A base Bid is separate and distinct from Alternate Bids, being the only cost component necessary for the award of the contract, and representing the minimum amount of Work that is essential for the functioning of the project.
- 1.7 *Bid Bond*: The security designated in the Bid Documents, furnished by Bidders as a guaranty of good faith to enter into a contract with the Owner, should a contract be awarded to that Bidder.
- 1.8 *Bidder*: Any business entity, individual or corporation that submits a bid for the performance of the work described in the Bid Documents, acting directly or through a duly authorized representative.
- 1.9 *Bid Documents*: The drawings, procurement and contracting requirements, general requirements, and the written specifications -including all addenda, that a bidder is required to reference in the submission of a bid.
- 1.10 *Bureau*: The State of Maine Bureau of General Services in the Department of Administrative and Financial Services.
- 1.11 *Calendar days*: Consecutive days, as occurring on a calendar, taking into account each day of the week, month, year, and any religious, national or local holidays.
- 1.12 *Certificate of Substantial Completion*: A document developed by the Architect that describes the final status of the Work and establishes the date that the Owner may use the facility for its intended

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purpose. The Certificate of Substantial Completion also include a provisional list of items (a "punch list") remaining to be corrected by the Contractor, if any, and identifies a date from which the project warranty period commences.

- 1.13 *Certificate of Occupancy*: A document developed by a local jurisdiction such as the Code Enforcement Officer that grants permission to the Owner to occupy a building.
- 1.14 *Change Order (CO)*: A document that modifies the contract and establishes the basis of a specific adjustment to the Contract Price or the Contract Time, or both. Change Orders may address correction of omissions, errors, and document discrepancies, or additional requirements. Change Orders should include all labor, materials and incidentals required to complete the work described. A Change Order is not valid until signed by the Contractor, Owner and Architect and approved by the Bureau.
- 1.15 *Change Order Proposal (COP)*: Change proposed by the Contractor in the contract amount, requirements, or time, which becomes a Change Order when approved by the Owner.
- 1.16 *Clerk of the Works*: The authorized representative of the Architect on the job site. Clerk of the Works is also called Architect's representative.
- 1.17 *Construction Change Directive (CCD)*: A written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to final agreement with the Contractor on adjustment, if any, in the Contract Price or Contract Time, or both.
- 1.18 *Contract*: A written agreement between the Owner and the successful bidder which obligates the Contractor to perform the work specified in the Contract Documents and obligates the Owner to compensate the Contractor at the mutually accepted sum, rates or prices.
- 1.19 *Contract Bonds (also known as Payment and Performance Bonds)*: The approved forms of security, furnished by the Contractor and their surety, which guarantee the faithful performance of all the terms of the contract and the payment of all bills for labor, materials and equipment by the Contractor.
- 1.20 *Contract Documents*: The drawings and written specifications (including all addenda), Standard General Conditions, and the contract (including all Change Orders subsequently incorporated in the documents).
- 1.21 *Contract Price*: The dollar amount of the construction contract, also called *Contract Sum*.
- 1.22 *Contract Time*: The designated duration of time to execute the Work of the contract, with a specific date for completion.
- 1.23 *Contractor*: Also called the "General Contractor" or "GC" the individual or entity undertaking the execution of the general contract work under the terms of the contract with the Owner, acting directly or through a duly authorized representative. The Contractor is responsible for the means, methods and materials utilized in the execution and completion of the Work.

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- 1.24 *Drawings*: The graphic and pictorial portion of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams.
- 1.25 *Filed Sub-bid*: The designated major Subcontractor's (or, in some cases, Contractor's) written offer of a specified dollar amount or amounts, submitted on a form included in the Bid Documents, for the performance of a particular portion of the Work. A Filed Sub-bid may include bonds or other requirements.
- 1.26 *Final Completion*: Project status indicating when the Work is fully completed in compliance with the Contract Documents. Final Completion is documented by a date on which the Contractor's obligations under the contract are complete and accepted by the Owner and final payment becomes due and payable.
- 1.27 *General Requirements*: The on-site overhead expense items the Contractor provides for the Project, typically including, but not limited to, building permits, construction supervision, Contract Bonds, insurance, field office, temporary utilities, rubbish removal, and site fencing. Overhead expenses of the Contractor's general operation are not included. Sometimes referred to as the Contractor's General Conditions.
- 1.28 *Owner*: The State agency which is represented by duly authorized individuals. The Owner is responsible for defining the scope of the Project and compensation to the Architect and Contractor.
- 1.29 *Owner's Representative*: The individual or entity contracted by the Owner to be an advisor and information conduit regarding the Project.
- 1.30 *Overhead*: General and administrative expenses of the Contractor's principal and branch offices, including payroll costs and other compensation of Contractor employees, deductibles paid on any insurance policy, charges against the Contractor for delinquent payments, and costs related to the correction of defective work, and the Contractor's capital expenses, including interest on capital used for the work.
- 1.31 *Performance and Payment Bonds (also known as Contract Bonds)*: The approved forms of security, furnished by the Contractor and their surety, which guarantee the faithful performance of all the terms of the contract and the payment of all bills for labor, materials and equipment by the Contractor.
- 1.32 *Post-Bid Addendum*: Document issued by the Architect that defines a potential Change Order prior to signing of the construction contract. The Post-Bid Addendum allows the Owner to negotiate contract changes with the Bidder submitting the lowest valid bid, only if the negotiated changes to the Bid Documents result in no change or no increase in the bid price.

A Post-Bid Addendum may also be issued after a competitive construction Bid opening to those Bidders who submitted a Bid initially, for the purpose of rebidding the Project work without re-advertising.

- 1.33 *Project*: The construction project proposed by the Owner to be constructed according to the Contract Documents. The entire public improvement project may also include separate construction and other

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activities conducted by the Owner or other contractors. The Owner shall inform all contractors of the scope of the entire public improvement project relative to each individual contract.

- 1.34 *Proposal*: The Contractor's written offer submitted to the Owner for consideration containing a specified dollar amount or rate, for a specific scope of work, and including a schedule impact, if any. A proposal shall include all costs for overhead and profit. After acceptance by all parties a proposal amends the contract and is implemented by the Contractor.
- 1.35 *Proposal Request (PR)*: An Owner's written request to the Contractor for a Change Order Proposal.
- 1.36 *Punch List*: A document that identifies the items of work remaining to be done by the Contractor at the Close Out of a Project. The Punch List is created as a result of a final inspection of the work only after the Contractor attests that all of the Work is in its complete and permanent status.
- 1.37 *Request For Information (RFI)*: A Contractor's written request to the Architect for clarification, definition or description of the Work. RFIs shall be presented by the Contractor in a timely manner to avoid any negative impact on the Schedule of Work.
- 1.38 *Request For Proposal (RFP)*: An Owner's written request to the Contractor for a Change Order Proposal.
- 1.39 *Requisition for Payment*: The document in which the Contractor certifies that the Work described is, to the best of the Contractor's knowledge, information and belief, complete and that all previous payments have been paid by the Contractor to Subcontractors and suppliers, and that the current requested payment is now due. See *Schedule of Values*.
- 1.40 *Retainage*: The amount, calculated at five percent (5%) of the contract value or a scheduled value, that the Owner shall withhold from the Contractor until the work or portion of work is declared substantially complete or otherwise accepted by the Owner. The Owner may, if requested, reduce the amount withheld if the Owner deems it desirable and prudent to do so. (See Title 5 M.R.S.A., Section 1746.)
- 1.41 *Sample*: A physical example provided by the Contractor which illustrates materials, equipment or workmanship and establishes standards by which the Work will be judged.
- 1.42 *Schedule of the Work*: The document prepared by the Contractor and approved by the Owner that specifies the dates on which the Contractor plans to begin and complete various parts of the Work, including dates on which information and approvals are required from the Owner.
- 1.43 *Schedule of Values*: The document prepared by the Contractor and approved by the Owner before the commencement of the Work that specifies the dollar values of discrete portions of the Work equal in sum to the contract amount. The Schedule of Values is used to document progress payments of the Work in regular (usually monthly) requisitions for payment. See *Requisition for Payment*.
- 1.44 *Shop Drawings*: The drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

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- 1.45 *Specifications*: The portion of the Contract Documents consisting of the written requirements of the Work for materials, equipment, systems, standards, workmanship, and performance of related services.
- 1.46 *Subcontractor*: An individual or entity undertaking the execution of any part of the Work by virtue of a written agreement with the Contractor or any other Subcontractor. Also, an individual or entity retained by the Contractor or any other Subcontractor as an independent contractor to provide the labor, materials, equipment or services necessary to complete a specific portion of the Work.
- 1.47 *Substantial Completion*: Project status indicating when the Work or a designated portion of the Work is sufficiently complete in compliance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended purpose without unscheduled disruption. Substantial Completion is documented by the date of the Certificate of Substantial Completion signed by the Owner and the Contractor.
- 1.48 *Superintendent*: The representative of the Contractor on the job site, authorized by the Contractor to receive and fulfill instructions from the Architect.
- 1.49 *Surety*: The individual or entity that is legally bound with the Contractor and Subcontractor to insure the faithful performance of the contract and for the payment of the bills for labor, materials and equipment by the Contractor and Subcontractors.
- 1.50 *Work*: The construction and services, whether completed or partially completed, including all labor, materials, equipment and services provided or to be provided by the Contractor and Subcontractors to fulfill the requirements of the Project as described in the Contract Documents.

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General Conditions

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1. Preconstruction Conference

- 1.1 The Contractor shall, upon acceptance of a contract and prior to commencing work, schedule a preconstruction conference with the Owner and Architect. The purpose of this conference is to:
- a) introduce all parties who have a significant role in the Project, including:
 - Owner (State Agency)
 - Bureau of General Services (BGS)
 - Architect
 - Consultants
 - Clerk-of-the-works
 - Contractor (GC)
 - Superintendent
 - Subcontractors
 - Other State agencies
 - Owner's Representative
 - Construction testing company
 - Commissioning agent
 - Special Inspections agent;
 - b) review the responsibilities of each party;
 - c) review any previously-identified special provisions of the Project;
 - d) review the Schedule of the Work calendar submitted by the Contractor to be approved by the Owner and Architect;
 - e) review the Schedule of Values form submitted by the Contractor to be approved by the Owner and Architect;
 - f) establish routines for Shop Drawing approval, contract changes, requisitions, et cetera;
 - g) discuss jobsite issues;
 - h) discuss Project close-out procedures;
 - i) provide an opportunity for clarification of Contract Documents before work begins;
 - j) schedule regular meetings at appropriate intervals for the review of the progress of the Work.

2. Intent and Correlation of Contract Documents

- 2.1 The intent of the Contract Documents is to describe the complete Project. The Contract Documents consist of various components; each component complements the others. What is shown as a requirement by any one component shall be inferred as a requirement on all corresponding components.
- 2.2 The Contractor shall furnish all labor, equipment and materials, tools, transportation, insurance, services, supplies, operations and methods necessary for, and reasonably incidental to, the construction and completion of the Project. Any work that deviates from the Contract Documents which appears to be required by the exigencies of construction or by inconsistencies in the Contract Documents, will be determined by the Architect and authorized in writing by the Architect, Owner and the Bureau prior to execution. The Contractor shall be responsible for requesting clarifying information where the intent of the Contract Documents is uncertain.
- 2.3 The Contractor shall not utilize any apparent error or omission in the Contract Documents to the disadvantage of the Owner. The Contractor shall promptly notify the Architect in writing of such errors or omissions. The Architect shall make any corrections or clarifications necessary in such a situation to document the true intent of the Contract Documents.

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3. Additional Drawings and Specifications

- 3.1 The Owner shall provide to the Contractor, at no additional expense to the Contractor, a reasonable quantity of additional Drawings and Specifications for the execution of the Work.
- 3.2 The Architect shall promptly furnish additional revised Drawings and Specifications that are created due to corrections or clarifications made by the Architect. All such information shall be consistent with, and reasonably inferred from, the Contract Documents. The Contractor shall do no work without the proper Drawings and Specifications.

4. Record of Documents

- 4.1 The Contractor shall maintain one complete set of Contract Documents on the jobsite, in good order and current status, for access by the Owner and Architect.
- 4.2 The Contractor shall maintain, continuously updated, complete records of Requests for Information, Architectural Supplemental Instructions, Information Bulletins, supplemental sketches, Change Order Proposals, Change Orders, Shop Drawings, testing reports, et cetera, for access by the Owner and Architect.

5. Ownership of Contract Documents

- 5.1 The designs represented on the Contract Documents are the property of the Architect. The Drawings and Specifications shall not be used on other work without consent of the Architect.

6. Shop Drawings

- 6.1 The Contractor shall administer Shop Drawings prepared by the Contractor, Subcontractors, suppliers or others to conform to the approved Schedule of the Work. The Contractor shall verify all field measurements, check and authorize all Shop Drawings and schedules required by the Work. The Contractor is the responsible party and contact for the Contractor's work as well as that of Subcontractors, suppliers or others who provide Shop Drawings.
- 6.2 The Architect shall review and acknowledge Shop Drawings, with reasonable promptness, for general conformity with the design concept of the project and compliance with the information provided in the Contract Documents.
- 6.3 The Contractor shall provide monthly updated logs containing: requests for information, information bulletins, supplemental instructions, supplemental sketches, change order proposals, change orders, submittals, testing and deficiencies.
- 6.4 The Contractor shall make any corrections required by the Architect, and shall submit a quantity of corrected copies as may be needed. The acceptance of Shop Drawings or schedules by the Architect shall not relieve the Contractor from responsibility for deviations from Drawings and Specifications, unless the Contractor has called such deviations to the attention of the Architect at the time of submission and secured the Architect's written approval. The acceptance of Shop Drawings or schedules by the Architect does not relieve the Contractor from responsibility for errors in Shop Drawings or schedules.

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7. Samples

- 7.1 The Contractor shall furnish for approval, with reasonable promptness, all samples as directed by the Architect. The Architect shall review and approve such samples, with reasonable promptness, for general conformity with the design concept of the project and compliance with the information provided in the Contract Documents. The subsequent work shall be in accord with the approved samples.

8. Substitutions

- 8.1 The Contractor shall furnish items and materials described in the Contract Documents. If the item or material specified describes a proprietary product, or uses the name of a manufacturer, the term "or approved equal" shall be implied, if it is not included in the text. The specific item or material specified establishes a minimum standard for the general design, level of quality, type, function, durability, efficiency, reliability, compatibility, warranty coverage, installation factors and required maintenance. The Drawing or written Specification shall not be construed to exclude other manufacturers products of comparable design, quality, and efficiency.
- 8.2 The Contractor may submit detailed information about a proposed substitution to the Architect for consideration. Particular models of items and particular materials which the Contractor asserts to be equal to the items and materials identified in the Contract Documents shall be allowed only with written approval by the Architect. The request for substitution shall include a cost comparison and a reason or reasons for the substitution.
- 8.3 The Architect may request additional information about the proposed substitution. The approval or rejection of a proposed substitution may be based on timeliness of the request, source of the information, the considerations of minimum standards described above, or other considerations. The Architect should briefly state the rationale for the decision. The decision shall be considered final.
- 8.4 The duration of a substitution review process can not be the basis for a claim for delay in the Schedule of the Work.

9. Patents and Royalties

- 9.1 The Contractor shall, for all time, secure for the Owner the free and undisputed right to the use of any patented articles or methods used in the Work. The expense of defending any suits for infringement or alleged infringement of such patents shall be borne by the Contractor. Awards made regarding patent suits shall be paid by the Contractor. The Contractor shall hold the Owner harmless regarding patent suits that may arise due to installations made by the Contractor, and to any awards made as a result of such suits.
- 9.2 Any royalty payments related to the work done by the Contractor for the Project shall be borne by the Contractor. The Contractor shall hold the Owner harmless regarding any royalty payments that may arise due to installations made by the Contractor.

10. Surveys, Layout of Work

- 10.1 The Owner shall furnish all property surveys unless otherwise specified.
- 10.2 The Contractor is responsible for correctly staking out the Work on the site. The Contractor shall employ a competent surveyor to position all construction on the site. The surveyor shall run the

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- axis lines, establish correct datum points and check each line and point on the site to insure their accuracy. All such lines and points shall be carefully preserved throughout the construction.
- 10.3 The Contractor shall lay out all work from dimensions given on the Drawings. The Contractor shall take measurements and verify dimensions of any existing work that affects the Work or to which the Work is to be fitted. The Contractor is solely responsible for the accuracy of all measurements. The Contractor shall verify all grades, lines, levels, elevations and dimensions shown on the Drawings and report any errors or inconsistencies to the Architect prior to commencing work.

11. Permits, Laws, and Regulations

- 11.1 The Owner is responsible for obtaining any zoning approvals or other similar local project approvals necessary to complete the Work, unless otherwise specified in the Contract Documents.
- 11.2 The Owner is responsible for obtaining Maine Department of Environmental Protection, Maine Department of Transportation, or other similar state government project approvals necessary to complete the Work, unless otherwise indicated in the Contract Documents.
- 11.3 The Owner is responsible for obtaining any federal agency project approvals necessary to complete the Work, unless otherwise indicated in the Contract Documents.
- 11.4 The Owner is responsible for obtaining all easements for permanent structures or permanent changes in existing facilities.
- 11.5 The Contractor is responsible for obtaining and paying for all permits and licenses necessary for the implementation of the Work. The Contractor shall notify the Owner of any delays, variance or restrictions that may result from the issuing of permits and licenses.
- 11.6 The Contractor shall comply with all ordinances, laws, rules and regulations and make all required notices bearing on the implementation of the Work. In the event the Contractor observes disagreement between the Drawings and Specifications and any ordinances, laws, rules and regulations, the Contractor shall promptly notify the Architect in writing. Any necessary changes shall be made as provided in the contract for changes in the work. The Contractor shall not perform any work knowing it to be contrary to such ordinances, laws, rules and regulations.
- 11.7 The Contractor shall comply with local, state and federal regulations regarding construction safety and all other aspects of the Work.

12. Taxes

- 12.1 The Owner is exempt from the payment of Federal Excise Taxes on articles not for resale and from the Federal Transportation Tax on all shipments, as well as Maine State Sales and Use Taxes. Pricing in all Change Order Proposals from the Contractor and Subcontractors shall not include these taxes.
- 12.2 Maine statute (36 M.R.S.A. §1760) allows "...an exemption from sales and use tax on items which will be physically incorporated in real property of an exempt organization. This exemption only applies to lumber, hardware, doors and windows, nails, insulation and other building materials actually affixed to realty. Tools, wearing apparel, consumable supplies, machinery and equipment used by the Contractor are taxable even if purchased specifically for the exempt job."
- 12.3 The Contractor may contact Maine Revenue Services, 24 State House Station, Augusta, Maine 04333 for guidance on tax exempt regulations authorized by 36 M.R.S.A. §1760 and detailed in Rule 302 (18-125 CMR 302).

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13. Labor and Wages

- 13.1 The Contractor shall conform to the labor laws of the State of Maine, and all other laws, ordinances, and legal requirements affecting the work in Maine.
- 13.2 The Architect shall include a wage determination document prepared by the Maine Department of Labor in the Contract Documents for state-funded contracts in excess of \$50,000. The document shows the minimum wages required to be paid to each category of labor employed on the project.
- 13.3 On projects requiring a Maine wage determination, the Contractor shall submit monthly payroll records to the Owner ("the contracting agency") showing the name and occupation of all workers and all independent contractors employed on the project. The monthly submission must also include the Contractor's company name, the title of the project, hours worked, hourly rate or other method of remuneration, and the actual wages or other compensation paid to each person.
- 13.4 The Contractor shall not reveal, in the payroll records submitted to the Owner, personal information regarding workers and independent contractors, other than the information described above. Such information shall not include Social Security number, employee identification number, or employee address or phone number, for example.
- 13.5 The Contractor shall conform to Maine statute by providing to the Owner a list of all subcontractors and independent contractors on the job site and a record of the entity to whom that subcontractor or independent contractor is directly contracted and by whom that subcontractor or independent contractor is insured for workers' compensation purposes.
- 13.6 The Contractor shall enforce strict discipline and good order among their employees at all times, and shall not employ any person unfit or unskilled to do the work assigned to them.
- 13.7 The Contractor shall promptly pay all employees when their compensation is due, shall promptly pay all others who have billed and are due for materials, supplies and services used in the Work, and shall promptly pay all others who have billed and are due for insurance, workers compensation coverage, federal and state unemployment compensation, and Social Security charges pertaining to this Project. Before final payments are made, the Contractor shall furnish to the Owner affidavits that all such payments described above have been made.
- 13.8 The Contractor may contact the Maine Department of Labor, 54 State House Station, Augusta, Maine 04333 for guidance on labor issues.

14. Insurance Requirements

- 14.1 The Contractor shall not commence work under this contract until the Contractor has obtained all insurance required under this article and such insurance has been approved by the Owner. The Contractor shall not allow any Subcontractor to commence work on a subcontract until all similar insurance required of the Subcontractor has been so obtained and approved.
- 14.2 The Owner does not warrant or represent that the insurance required under this article constitutes an insurance portfolio which adequately addresses all risks faced by the Contractor or its Subcontractors. The Contractor and Subcontractors of every tier shall satisfy themselves as to the existence, extent and adequacy of insurance prior to commencement of work.
- 14.3 The Contractor and any Subcontractor shall procure and maintain for the duration of the Project insurance of the types and limits set forth under this article and such insurance as will protect themselves from claims which may arise out of or result from the Contractor's or Subcontractor's execution of the work, whether such execution be by themselves or by anyone directly or indirectly employed by any of them or by anyone for whose acts any of them may be liable. The insurance coverage provided by the Contractor and any Subcontractor will be primary coverage.

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14.4 Workers' Compensation Insurance

Worker's Compensation insurance for all employees on site in accordance with the requirements of the Workers' Compensation law of the State of Maine.

Minimum acceptable limits for Employer's Liability are:

Bodily Injury by Accident.....	\$500,000
Bodily Injury by Disease.....	\$500,000 Each Employee
Bodily Injury by Disease.....	\$500,000 Policy Limit

14.5 Liability Insurance

a) General Liability Insurance

General liability insurance for bodily injury and property damage liability for all hazards of the Project including premise and operations, products and completed operations, contractual, and personal injury liabilities. It shall include collapse and underground coverage - as well as explosion coverage if explosion hazards exist. Aggregate limits shall apply on a per location or project basis.

Minimum acceptable limits are:

General aggregate limit	\$2,000,000
Products and completed operations aggregate.....	\$1,000,000
Each occurrence limit.....	\$1,000,000
Personal injury aggregate	\$1,000,000

b) Automobile Liability Insurance

Automobile liability insurance against claims for bodily injury, death or property damage resulting from the maintenance, ownership or use of all owned, non-owned and hired automobiles, trucks and trailers.

Minimum acceptable limit is:

Any one accident or loss	\$1,000,000
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c) Owners Protective Liability Insurance

For Contracts exceeding \$50,000 in total Contract amount, Contractor shall secure an Owners Protective Liability policy naming the Owner as the Named Insured.

Minimum acceptable limits are:

General aggregate limit	\$2,000,000
Each occurrence limit.....	\$1,000,000

d) Pollution Liability Insurance

In the event that any disruption, handling, abatement, remediation, encapsulation, removal, transport, or disposal of contaminated or hazardous material is required, the Contractor or its Subcontractor shall secure a pollution liability policy in addition to any other coverages contained in this section. The insurance shall be provided on an occurrence based policy and shall remain in effect for the duration of the Project.

Minimum acceptable limit is:

Each occurrence limit.....	\$1,000,000
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14.6 Property Insurance

a) New Construction Only

The Contractor shall procure and maintain Builder's Risk insurance naming the Owner, Contractor and all Subcontractors as insureds as their interest may appear. The covered cause of loss form shall be Risks of Direct Physical Loss, endorsed to include flood, earthquake, testing and ensuing loss and shall include coverage for materials in transit and materials stored off site. Coverage shall be on a replacement cost and a completed value basis. Unless specifically authorized by the Owner, the limit of insurance shall not be less than the contract amount and coverage shall apply during the entire contract period until the Certificate of Substantial Completion is accepted by the Owner.

b) Renovations within and Additions to Existing Buildings Insured by State of Maine Risk Management Division

Insurance shall be provided by the Owner. The Owner shall provide the following Project information to the State of Maine Risk Management Division prior to commencement of the Work in order to initiate the insurance coverage: building name, street address and municipality, brief project description, project start date and completion date, contract dollar value, and Contractor name and address. Said insurance shall name the Contractor and all Subcontractors as insureds as their interest may appear. The covered causes of loss form shall be Risks of Direct Physical Loss, endorsed to include flood, earthquake, testing and ensuing loss and shall include coverage for materials in transit and materials stored off site. Theft coverage is not included and exclusions common to commercial property policies are applicable. The Contractor shall be responsible for a \$500 deductible per occurrence. Unless specifically authorized by the Owner, the limit of insurance shall not be less than the contract amount and coverage shall apply during the entire contract period until the Certificate of Substantial Completion is accepted by the Owner. Verification of insurance will be furnished to the Contractor upon request. The Contractor may independently acquire, at the Contractor's expense, coverage in excess of that maintained by the State of Maine.

- 14.7** The Contractor shall provide four original copies of all certificates of insurance in a form, and issued by, companies acceptable to the Owner prior to commencement of work. The certificates shall name the Owner as certificate holder. The certificates shall contain a provision that coverage afforded under the insurance policies will not be canceled or materially changed unless at least thirty (30) calendar days prior written notice by registered letter has been given to the Owner.

15. Contract Bonds

- 15.1** When noted as required in the Bid Documents, the Contractor shall provide to the Owner a Performance Bond and a Payment Bond, or "contract bonds", upon execution of the contract. Each bond value shall be for the full amount of the contract and issued by a surety company authorized to do business in the State of Maine as approved by the Owner. The bonds shall be executed on the forms furnished in the Bid Documents. The bonds shall allow for any addition or deductions of the contract.
- 15.2** The contract bonds shall continue in effect for one year after final acceptance of the contract to protect the Owner's interest in connection with the one year guarantee of workmanship and materials and to assure settlement of claims for the payment of all bills for labor, materials and equipment by the Contractor.

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16. Allowances

- 16.1 The Contract Price shall include all allowances described in the Contract Documents. The Contractor shall include all overhead and profit necessary to implement each allowance in their Contract Price.
- 16.2 The Contractor shall not be required to employ parties for allowance work against whom the Contractor has a reasonable objection. In such a case, the Contractor shall notify the Owner in writing of their position and shall propose an alternative party to complete the work of the allowance.

17. Assignment of Contract

- 17.1 The Contractor shall not assign or sublet the contract as a whole without the written consent of the Owner. The Contractor shall not assign any money due to the Contractor without the written consent of the Owner.

18. Separate Contracts

- 18.1 The Owner reserves the right to create other contracts in connection with this Project using similar General Conditions. The Contractor shall allow the Owner's other contractors reasonable opportunity for the delivery and storage of materials and the execution of their work. The Contractor shall coordinate and properly connect the Work of all contractors.
- 18.2 The Contractor shall promptly report to the Architect and Owner any apparent deficiencies in work of the Owner's other contractors that impacts the proper execution or results of the Contractor. The Contractor's failure to observe or report any deficiencies constitutes an acceptance of the Owner's other contractors work as suitable for the interface of the Contractor's work, except for latent deficiencies in the Owner's other contractors work.
- 18.3 Similarly, the Contractor shall promptly report to the Architect and Owner any apparent deficiencies in their own work that would impact the proper execution or results of the Owner's other contractors.
- 18.4 The Contractor shall report to the Architect and Owner any conflicts or claims for damages with the Owner's other contractors and settle such conflicts or claims for damages by mutual agreement or arbitration, if necessary, at no expense to the Owner.
- 18.5 In the event the Owner's other contractors sue the Owner regarding any damage alleged to have been caused by the Contractor, the Owner shall notify the Contractor, who shall defend such proceedings at the Contractor's expense. The Contractor shall pay or satisfy any judgment that may arise against the Owner, and pay all other costs incurred.

19. Subcontracts

- 19.1 The Contractor shall not subcontract any part of this contract without the written permission of the Owner.
- 19.2 The Contractor shall submit a complete list of named Subcontractors and material suppliers to the Architect and Owner for approval by the Owner prior to commencing work. The Subcontractors named shall be reputable companies of recognized standing with a record of satisfactory work.

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- 19.3 The Contractor shall not employ any Subcontractor or use any material until they have been approved, or where there is reason to believe the resulting work will not comply with the Contract Documents.
- 19.4 The Contractor, not the Owner, is as fully responsible for the acts and omissions of Subcontractors and of persons employed by them, as the Contractor is for the acts and omissions of persons directly or indirectly employed by the Contractor.
- 19.5 Neither the Contract Documents nor any Contractor-Subcontractor contract shall indicate, infer or create any direct contractual relationship between any Subcontractor and the Owner.

20. Contractor-Subcontractor Relationship

- 20.1 The Contractor shall be bound to the Subcontractor by all the obligations in the Contract Documents that bind the Contractor to the Owner.
- 20.2 The Contractor shall pay the Subcontractor, in proportion to the dollar value of the work completed by the Subcontractor, the dollar amount allowed to the Contractor at the time each Contractor's Requisition for Payment is approved by the Owner.
- 20.3 The Contractor shall pay the Subcontractor accordingly if the Contract Documents or the subcontract provide for earlier or larger payments than described in the provision above.
- 20.4 The Contractor shall pay the Subcontractor on demand for subcontract work or materials as far as executed and fixed in place, less retainage, at the time the Contractor's Requisition for Payment is approved by the Owner, even if the Architect fails to certify a portion of the Requisition for Payment for a cause not the fault of the Subcontractor.
- 20.5 The Contractor shall not make a claim for liquidated damages or penalty for delay in any amount in excess of amounts that are specified by the subcontract.
- 20.6 The Contractor shall not make a claim for services rendered or materials furnished by the Subcontractor unless written notice is given by the Contractor to the Subcontractor within ten calendar days of the day in which the claim originated.
- 20.7 The Contractor shall give the Subcontractor an opportunity to present and to submit evidence in any progress conference or disputes involving subcontract work.
- 20.8 The Contractor shall pay the Subcontractor a just share of any fire insurance payment received by the Contractor.
- 20.9 The Subcontractor shall be bound to the Contractor by the terms of the Contract Documents and assumes toward the Contractor all the obligations and responsibilities that the Contractor, by those documents, assumes toward the Owner.
- 20.10 The Subcontractor shall submit applications for payment to the Contractor in such reasonable time as to enable the Contractor to apply for payment as specified.
- 20.11 The Subcontractor shall make any claims for extra cost, extensions of time or damages, to the Contractor in the manner provided in these General Conditions for like claims by the Contractor to the Owner, except that the time for the Subcontractor to make claims for extra cost is seven calendar days after the receipt of Architect's instructions.

21. Supervision of the Work

- 21.1 During all stages of the Work the Contractor shall have a competent superintendent, with any necessary assistant superintendents, overseeing the project. The superintendent shall not be reassigned without the consent of the Owner unless a superintendent ceases to be employed by the Contractor due to unsatisfactory performance.

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- 21.2 The superintendent represents the Contractor on the jobsite. Directives given by the Architect or Owner to the superintendent shall be as binding as if given directly to the Contractor's main office. All important directives shall be confirmed in writing to the Contractor. The Architect and Owner are not responsible for the acts or omissions of the superintendent or assistant superintendents.
- 21.3 The Contractor shall provide supervision of the Work equal to the industry's highest standard of care. The superintendent shall carefully study and compare all Contract Documents and promptly report any error, inconsistency or omission discovered to the Architect. The Contractor may not necessarily be held liable for damages resulting directly from any error, inconsistency or omission in the Contract Documents or other instructions by the Architect that was not revealed by the superintendent in a timely way.

22. Observation of the Work

- 22.1 The Contractor shall allow the Owner, the Architect and the Bureau continuous access to the site for the purpose of observation of the progress of the work. All necessary safeguards and accommodations for such observations shall be provided by the Contractor.
- 22.2 The Contractor shall coordinate all required testing, approval or demonstration of the Work. The Contractor shall give sufficient notice to the appropriate parties of readiness for testing, inspection or examination.
- 22.3 The Contractor shall schedule inspections and obtain all required certificates of inspection for inspections by a party other than the Architect.
- 22.4 The Architect shall make all scheduled observations promptly, prior to the work being concealed or buried by the Contractor. If approval of the Work is required of the Architect, the Contractor shall notify the Architect of the construction schedule in this regard. Work concealed or buried prior to the Architect's approval may need to be uncovered at the Contractor's expense.
- 22.5 The Architect may order reexamination of questioned work, and, if so ordered, the work must be uncovered by the Contractor. If the work is found to conform to the Contract Documents, the Owner shall pay the expense of the reexamination and remedial work. If the work is found to not conform to the Contract Documents, the Contractor shall pay the expense, unless the defect in the work was caused by the Owner's Contractor, whose responsibility the reexamination expense becomes.
- 22.6 The Bureau shall periodically observe the Work during the course of construction and make recommendations to the Contractor or Architect as necessary. Such recommendations shall be considered and implemented through the usual means for changes to the Work.

23. Architect's Status

- 23.1 The Architect represents the Owner during the construction period, and observes the work in progress on behalf of the Owner. The Architect has authority to act on behalf of the Owner only to the extent expressly provided by the Contract Documents or otherwise demonstrated to the Contractor. The Architect has authority to stop the work whenever such an action is necessary, in the Architect's reasonable opinion, to ensure the proper execution of the contract.
- 23.2 The Architect is the interpreter of the conditions of the contract and the judge of its performance. The Architect shall favor neither the Owner nor the Contractor, but shall use the Architect's powers under the contract to enforce faithful performance by both parties.

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- 23.3 In the event of the termination of the Architect's employment on the project prior to completion of the work, the Owner shall appoint a capable and reputable replacement. The status of the new Architect relative to this contract shall be that of the former Architect.

24. Management of the Premises

- 24.1 The Contractor shall place equipment and materials, and conduct activities on the premises in a manner that does not unreasonably hinder site circulation, environmental stability, or any long term effect. Likewise, the Architect's directions shall not cause the use of premises to be impeded for the Contractor or Owner.
- 24.2 The Contractor shall not use the premises for any purpose other than that which is directly related to the scope of work. The Owner shall not use the premises for any purpose incompatible with the proposed work simultaneous to the work of the Contractor.
- 24.3 The Contractor shall enforce the Architect's instructions regarding information posted on the premises such as signage and advertisements, as well as activities conducted on the premises such as fires, and smoking.
- 24.4 The Owner may occupy any part of the Project that is completed with the written consent of the Contractor, and without prejudice to any of the rights of the Owner or Contractor. Such use or occupancy shall not, in and of itself, be construed as a final acceptance of any work or materials.

25. Safety and Security of the Premises

- 25.1 The Contractor shall continuously maintain security on the premises and protect from unreasonable occasion of injury all people authorized to be on the job site. The Contractor shall also effectively protect the property and adjacent properties from damage or loss.
- 25.2 The Contractor shall take all necessary precautions to ensure the safety of workers and others on and adjacent to the site, abiding by applicable local, state and federal safety regulations. The Contractor shall erect and continuously maintain safeguards for the protection of workers and others, and shall post signs and other warnings regarding hazards associated with the construction process, such as protruding fasteners, moving equipment, trenches and holes, scaffolding, window, door or stair openings, and falling materials.
- 25.3 The Contractor shall designate, and make known to the Architect and the Owner, a safety officer whose duty is the prevention of accidents on the site.
- 25.4 The Contractor shall restore the premises to conditions that existed prior to the start of the project at areas not intended to be altered according to the Contract Documents.
- 25.5 The Contractor shall protect existing utilities and exercise care working in the vicinity of utilities shown in the Drawings and Specifications or otherwise located by the Contractor.
- 25.6 The Contractor shall protect from damage existing trees and other significant plantings and landscape features of the site which will remain a permanent part of the site. If necessary or indicated in the Contract Documents, tree trunks shall be boxed and barriers erected to prevent damage to tree branches or roots.
- 25.7 Damage to the Work, including that which is reasonably protected, shall be repaired or replaced at the expense of the party who caused the damage.
- 25.8 The Contractor shall not load, or allow to be loaded, any part of the Project with a force which imperils personal or structural safety. The Architect may consult with the Contractor on such means and methods of construction, however, the ultimate responsibility lies with the Contractor.

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- 25.9 The Contractor shall not jeopardize any work in place with subsequent construction activities such as blasting, drilling, excavating, cutting, patching or altering work. The Architect must approve altering any structural components of the project. The Contractor shall supervise all construction activities carried out by others on site to ensure that the work is neatly done and in a manner that will not endanger the structure or the component parts.
- 25.10 The Contractor may act with their sole discretion in emergency situations that potentially effect health, life or serious damage to the premises or adjacent properties, to prevent such potential loss or injury. The Contractor may negotiate with the Owner for compensation for expenses due to such emergency work.
- 25.11 The Contractor shall keep the premises free of any unsafe accumulation of waste materials caused by the work. The Contractor shall regularly keep the spaces "broom clean". See the Close-out of the Work provisions of this section regarding cleaning at the completion of the project.

26. Changes in the Work

- 26.1 The Contractor shall not proceed with extra work without an approved Change Order or Construction Change Directive. A Change Order which has been properly signed by all parties shall become a part of the contract.
- 26.2 A Change Order is the usual document for directing changes in the Work. In certain circumstances, however, the Owner may utilize a Construction Change Directive to direct the Contractor to perform changes in the Work that are generally consistent with the scope of the project. The Owner shall use a Construction Change Directive only when the normal process for approving changes to the Work has failed to the detriment of the Project, or when agreement on the terms of a Change Order cannot be met, or when an urgent situation requires, in the Owner's judgment, prompt action by the Contractor.
- 26.3 The Architect shall prepare the Construction Change Directive representing a complete scope of work, with proposed Contract Price and Contract Time revisions, if any, clearly stated.
- 26.4 The Contractor shall promptly carry out a Construction Change Directive which has been signed by the Owner and the Architect. Work thus completed by the Contractor constitutes the basis for a Change Order. Changes in the Contract Price and Contract Time shall be as defined in the Construction Change Directive unless subsequently negotiated with some other terms.
- 26.5 The method of determining the dollar value of extra work shall be by:
- a) an estimate of the Contractor accepted by Owner as a lump sum, or
 - b) unit prices named in the contract or subsequently agreed upon, or
 - c) cost plus a designated percentage, or
 - d) cost plus a fixed fee.
- 26.6 The Contractor shall determine the dollar value of the extra work for both the lump sum and cost plus designated percentage methods using the following rates. The rates include all overhead and profit expenses.
- a) Contractor - for any work performed by the Contractor's own forces, 20% of the cost;
 - b) Subcontractor - for work performed by Subcontractor's own forces, 20% of the cost;
 - c) Contractor - for work performed by Contractor's Subcontractor, 10% of the amount due the Subcontractor.
- 26.7 The Contractor shall keep and provide records as needed or directed for the cost plus designated percentage method. The Architect shall review and certify the appropriate amount which includes the Contractor's overhead and profit. The Owner shall make payments based on the Architect's certificate.

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- 26.8 Cost reflected in Change Orders shall be limited to the following: cost of materials, cost of delivery, cost of labor (including Social Security, pension, Workers' Compensation insurance, and unemployment insurance), and cost of rental of power tools and equipment. Labor cost may include a pro-ratio share of a foreman's time only in the case of an extension of contract time granted due to the Change Order.
- 26.9 Overhead reflected in Change Orders shall be limited to the following: bond premium, supervision, wages of clerks, time keepers, and watchmen, small tools, incidental expenses, general office expenses, and all other overhead expenses directly related to the Change Order.
- 26.10 The Contractor shall provide credit to the Owner for labor, materials, equipment and other costs but not overhead and profit expenses for those Change Order items that result in a net value of credit to the contract.
- 26.11 The Owner may change the scope of work of the Project without invalidating the contract. The Owner shall notify the Contractor of a change of the scope of work for the Owner's Contractors, which may affect the work of this Contractor, without invalidating the contract. Change Orders for extension of the time caused by such changes shall be developed at the time of directing the change in scope of work.
- 26.12 The Architect may order minor changes in the Work, not involving extra cost, which is consistent with the intent of the design or project.
- 26.13 The Contractor shall immediately give written notification to the Architect of latent conditions discovered at the site which materially differ from those represented in the Drawings or Specifications, and which may eventually result in a change in the scope of work. The Contractor shall suspend work until receiving direction from the Architect. The Architect shall promptly investigate the conditions and respond to the Contractor's notice with direction that avoids any unnecessary delay of the Work. The Architect shall determine if the discovered conditions warrant a Change Order.
- 26.14 The Contractor shall, within ten calendar days of receipt of the information, give written notification to the Architect if the Contractor claims that instructions by the Architect will constitute extra cost not accounted for by Change Order or otherwise under the contract. The Architect shall promptly respond to the Contractor's notice with direction that avoids any unnecessary delay of the Work. The Architect shall determine if the Contractor's claim warrants a Change Order.
27. Correction of the Work
- 27.1 The Contractor shall promptly remove from the premises all work the Architect declares is non-conforming to the contract. The Contractor shall replace the work properly at no expense to the Owner. The Contractor is also responsible for the expenses of others whose work was damaged or destroyed by such remedial work.
- 27.2 The Owner may elect to remove non-conforming work if it is not removed by the Contractor within a reasonable time, that time defined in a written notice from the Architect. The Owner may elect to store removed non-conforming work not removed by the Contractor at the Contractor's expense. The Owner may, with ten days written notice, dispose of materials which the Contractor does not remove. The Owner may sell the materials and apply the net proceeds, after deducting all expenses, to the costs that should have been borne by the Contractor.
- 27.3 The Contractor shall remedy any defects due to faulty materials or workmanship and pay for any related damage to other work which appears within a period of one year from the date of substantial completion, and in accord with the terms of any guarantees provided in the contract.

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The Owner shall promptly give notice of observed defects to the Contractor and Architect. The Architect shall determine the status of all claimed defects.

- 27.4 The Architect may authorize, after a reasonable notification to the Contractor, an equitable deduction from the contract amount in lieu of the Contractor correcting non-conforming or defective work.

28. Owner's Right to do Work

- 28.1 The Owner may, using other contractors, correct deficiencies attributable to the Contractor, or complete unfinished work. Such action shall take place only after giving the Contractor three days written notice, and provided the Architect approves of the proposed course of action as an appropriate remedy. The Owner may then deduct the cost of the remedial work from the amount due the Contractor.
- 28.2 The Owner may act with their sole discretion when the Contractor is unable to take action in emergency situations that potentially effect health, life or serious damage to the premises or adjacent properties, to prevent such potential loss or injury. The Owner shall inform the Contractor of the emergency work performed, particularly where it may affect the work of the Contractor.

29. Termination of Contract and Stop Work Action

- 29.1 The Owner may, owing to a certificate of the Architect indicating that sufficient cause exists to justify such action, without prejudice to any other right or remedy and after giving the Contractor and the Contractor's surety seven days written notice, terminate the employment of the Contractor. At that time the Owner may take possession of the premises and of all materials, tools and appliances on the premises and finish the work by whatever method the Owner may deem expedient. Cause for such action by the Owner includes: if the contractor is adjudged bankrupt, or makes a general assignment for the benefit of its creditors, or if a receiver is appointed due to the Contractor's insolvency, or if the Contractor persistently or repeatedly refuses or fails to provide enough properly skilled workers or proper materials, or if the Contractor fails to make prompt payment to Subcontractors or material or labor suppliers, or if the Contractor persistently disregards laws, ordinances or the instructions of the Architect, or is otherwise found guilty of a substantial violation of a provision of the Contract Documents.
- 29.2 The Contractor is not entitled, as a consequence of the termination of the employment of the Contractor as described above, to receive any further payment until the Work is finished. If the unpaid balance of the contract amount exceeds the expense of finishing the Work, including compensation for additional architectural, managerial and administrative services, such balance shall be paid to the Contractor. If the expense of finishing the Work exceeds the unpaid balance, the Contractor shall pay the difference to the Owner. The Architect shall certify the expense incurred by the Contractor's default. This obligation for payment shall continue to exist after termination of the contract.
- 29.3 The Contractor may, if the Work is stopped by order of any court or other public authority for a period of thirty consecutive days, and through no act or fault of the Contractor or of anyone employed by the Contractor, with seven days written notice to the Owner and the Architect, terminate this contract. The Contractor may then recover from the Owner payment for all work executed, any proven loss and reasonable profit and damage.

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- 29.4 The Contractor may, if the Architect fails to issue a certificate for payment within seven days after the Contractor's formal request for payment, through no fault of the Contractor, or if the Owner fails to pay to the Contractor within 30 days after submission of any sum certified by the Architect, with seven days written notice to the Owner and the Architect, stop the Work or terminate this Contract.

30. Delays and Extension of Time

- 30.1 The completion date of the contract shall be extended if the work is delayed by changes ordered in the work which have approved time extensions, or by an act or neglect of the Owner, the Architect, or the Owner's Contractor, or by strikes, lockouts, fire, flooding, unusual delay in transportation, unavoidable casualties, or by other causes beyond the Contractor's control. The Architect shall determine the status of all claimed causes.
- 30.2 The contract shall not be extended for delay occurring more than seven calendar days before the Contractor's claim made in writing to the Architect. In case of a continuing cause of delay, only one claim is necessary.
- 30.3 The contract shall not be extended due to failure of the Architect to furnish drawings if no schedule or agreement is made between the Contractor and the Architect indicating the dates which drawings shall be furnished and fourteen calendar days has passed after said date for such drawings.
- 30.4 This article does not exclude the recovery of damages for delay by either party under other provisions in the Contract Document.

31. Payments to the Contractor

- 31.1 As noted under *Preconstruction Conference* in this section, the Contractor shall submit a Schedule of Values form, before the first application for payment, for approval by the Owner and Architect. The Architect may direct the Contractor to provide evidence that supports the correctness of the form. The approved Schedule of Values shall be used as a basis for payments.
- 31.2 The Contractor shall submit an application for each payment ("Requisition for Payment") on a form approved by the Owner and Architect. The Architect may require receipts or other documents showing the Contractor's payments for materials and labor, including payments to Subcontractors.
- 31.3 The Contractor shall submit Requisitions for Payment as the work progresses not more frequently than once each month, unless the Owner approves a more frequent interval due to unusual circumstances. The Requisition for Payment is based on the proportionate quantities of the various classes of work completed or incorporated in the Work, in agreement with the actual progress of the Work and the dollar value indicated in the Schedule of Values.
- 31.4 The Architect shall verify and certify each Requisition for Payment which appears to be complete and correct prior to payment being made by the Owner. The Architect may certify an appropriate amount for materials not incorporated in the Work which have been delivered and suitably stored at the site. The Contractor shall submit bills of sale, insurance certificates, or other such documents that will adequately protect the Owner's interests prior to payments being certified.
- 31.5 In the event any materials delivered but not yet incorporated in the Work have been included in a certified Requisition for Payment with payment made, and said materials thereafter are damaged, deteriorated or destroyed, or for any reason whatsoever become unsuitable or unavailable for use

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in the Work, the full amount previously allowed shall be deducted from subsequent payments unless the Contractor satisfactorily replaces said material.

- 31.6 The Contractor may request certification of an appropriate dollar amount for materials not incorporated in the Work which have been delivered and suitably stored away from the site. The Contractor shall submit bills of sale, insurance certificates, right-of-entry documents or other such documents that will adequately protect the Owner's interests. The Architect shall determine if the Contractor's documentation for the materials is complete and specifically designated for the Project. The Owner may allow certification of such payments.
- 31.7 Subcontractors may request, and shall receive from the Architect, copies of approved Requisitions for Payment showing the amounts certified in the Schedule of Values.
- 31.8 Certified Requisitions for Payment, payments made to the Contractor, or partial or entire occupancy of the project by the Owner shall not constitute an acceptance of any work that does not conform to the Contract Documents. The making and acceptance of the final payment constitutes a waiver of all claims by the Owner, other than those arising from unsettled liens, from faulty work or materials appearing within one year from final payment or from requirements of the Drawings and Specifications, and of all claims by the Contractor, except those previously made and still unsettled.
- 31.9 The Owner shall retain five percent of each payment due the Contractor as part security for the fulfillment of the contract by the Contractor. The Owner may make payment of a portion of this "retainage" to the Contractor temporarily or permanently during the progress of the Work. The Owner may thereafter withhold further payments until the full amount of the five percent is reestablished. The Contractor may deposit with the Maine State Treasurer certain securities in place of retainage amounts due according to Maine Statute (M.R.S.A. 5, Section 1746).

32. Payments Withheld

- 32.1 The Architect may withhold or nullify the whole or a portion of any Requisitions for Payment submitted by the Contractor in the amount that may be necessary, in his reasonable opinion, to protect the Owner from loss due to any of the following:
- a) defective work not remedied;
 - b) claims filed or reasonable evidence indicating probable filing of claims;
 - c) failure to make payments properly to Subcontractors or suppliers;
 - d) a reasonable doubt that the contract can be completed for the balance then unpaid;
 - e) liability for damage to another contractor.

The Owner shall make payment to the Contractor, in the amount withheld, when the above circumstances are removed.

33. Liens

- 33.1 The Contractor shall deliver to the Owner a complete release of all liens arising out of this contract before the final payment or any part of the retainage payment is released. The Contractor shall provide with the release of liens an affidavit asserting each release includes all labor and materials for which a lien could be filed. Alternately, the Contractor, in the event any Subcontractor or supplier refuses to furnish a release of lien in full, may furnish a bond satisfactory to the Owner, to indemnify the Owner against any lien.

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- 33.2 In the event any lien remains unsatisfied after all payments to the Contractor are made by the Owner, the Contractor shall refund to the Owner all money that the latter may be compelled to pay in discharging such lien, including all cost and reasonable attorney's fees.

34. Indemnification

- 34.1 The Contractor shall indemnify and hold harmless the Owner, its officers, agents, and employees from and against any and all claims, liabilities and costs, including reasonable attorney's fees, for any or all injuries to persons, property or claims for money damages arising from the negligent acts or omissions of the Contractor, its employees or agents, officers or subcontractors in the performance of work under this Agreement.

35. Workmanship

- 35.1 The Contractor shall provide materials, equipment, and installed work equal to or better than the quality specified in the Contract Documents and approved in submittal and sample. The installation methods shall be of the highest standards, and the best obtainable from the respective trades. The Architect's decision on the quality of work shall be final.
- 35.2 The Contractor shall know local labor conditions for skilled and unskilled labor in order to apply the labor appropriately to the Work. All labor shall be performed by individuals well skilled in their respective trades.
- 35.3 The Contractor shall perform all cutting, fitting, patching and placing of work in such a manner to allow subsequent work to fit properly, whether that be by the Contractor, the Owner's Contractors or others. The Owner and Architect may advise the Contractor regarding such subsequent work. Notwithstanding the notification or knowledge of such subsequent work, the Contractor may be directed to comply with this standard of compatible construction by the Architect at the Contractor's expense.
- 35.4 The Contractor shall request clarification or revision of any design work by the Architect, prior to commencing that work, in a circumstance where the Contractor believes the work cannot feasibly be completed at the highest quality, or as indicated in the Contract Documents. The Architect shall respond to such requests in a timely way, providing clarifying information, a feasible revision, or instruction allowing a reduced quality of work. The Contractor shall follow the direction of the Architect regarding the required request for information.
- 35.5 The Contractor shall guarantee the Work against any defects in workmanship and materials for a period of one year commencing with the date of the Certificate of Substantial Completion, unless specified otherwise for specific elements of the project. The Work may also be subdivided in mutually agreed upon components, each defined by a Certificate of Substantial Completion.

36. Close-out of the Work

- 36.1 The Contractor shall remove from the premises all waste materials caused by the work. The Contractor shall make the spaces "broom clean" unless a more exactly cleaning is specified. The Contractor shall wash all windows and glass immediately prior to the final inspection, unless otherwise directed.

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- 36.2 The Owner may conduct the cleaning of the premises where the Contractor, duly notified by the Architect, fails to adequately complete the task. The expense of this cleaning may be deducted from the sum due to the Contractor.
- 36.3 The Contractor shall participate in all final inspections and acknowledge the documentation of unsatisfactory work, generally called the "punch list", to be corrected by the Contractor. The Architect shall document the successful completion of the Work in a dated Certificate of Substantial Completion, to be signed by Owner, Architect, and Contractor.
- 36.4 The Contractor shall not call for final inspection of any portion of the Work that is not complete and permanent installed. The Contractor may be found liable for the expenses of individuals called to final inspection meetings prematurely.
- 36.5 The Contractor and all major Subcontractors shall participate in the end-of-warranty-period conference, typically scheduled close to one year after the Substantial Completion date.

37. Date of Completion and Liquidated Damages

- 37.1 The Contractor may make a written request to the Owner for an extension or reduction of time, if necessary. The request shall include the reasons the Contractor believes justifies the proposed completion date. The Owner may grant the revision of the contract completion date if the Work was delayed due to conditions beyond the control and the responsibility of the Contractor. The Contractor shall not conduct unauthorized accelerated work or file delay claims to recover alleged damages for unauthorized early completion.
- 37.2 The Contractor shall vigorously pursue the completion of the Work and notify the Owner of any factors that have, may, or will affect the approved Schedule of the Work. The Contractor may be found responsible for expenses of the Owner or Architect if the Contractor fails to make notification of project delays.
- 37.3 The Project is planned to be done in an orderly fashion which allows for an iterative submittal review process, construction administration including minor changes in the Work and some bad weather. The Contractor shall not file delay claims to recover alleged damages on work the Architect determines has followed the expected rate of progress.
- 37.4 The Architect shall prepare the Certificate of Substantial Completion which, when signed by the Owner and the Contractor, documents the date of Substantial Completion of the Work or a designated portion of the Work. The Owner shall not consider the issuance of a Certificate of Occupancy by an outside authority a prerequisite for Substantial Completion if the Certificate of Occupancy cannot be obtained due to factors beyond the Contractor's control.
- 37.5 Liquidated Damages may be deducted from the sum due to the Contractor for each calendar day that the Work remains uncompleted after the completion date specified in the Contract or an approved amended completion date. The dollar amount per day shall be calculated using the Schedule of Liquidated Damages table shown below.

<u>If the original contract amount is:</u>	<u>The per day Liquidated Damages shall be:</u>
More than \$100,000 and less than \$2,000,000	\$750
More than \$2,000,000 and less than \$10,000,000	\$1,500
More than \$10,000,000	\$1,500 plus \$250 for each \$2,000,000 over \$10,000,000

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38. Dispute Resolution

38.1 Mediation

- a) In the event of a dispute between the parties which arises under this Agreement in which the dispute cannot be resolved through informal negotiation, the dispute shall be submitted to a neutral mediator jointly selected by the parties.
- b) Either party may file suit before or during mediation if the party, in good faith, deems it to be necessary to avoid losing the right to sue due to a statute of limitations. If suit is filed before good faith mediation efforts are completed, the party filing suit shall agree to stay all proceedings in the lawsuit pending completion of the mediation process, provided such stay is without prejudice.
- c) In any mediation between the Owner and the Architect, the Owner has the right to consolidate related claims between Owner and Contractor.

38.2 Arbitration

- a) If the dispute is not resolved through mediation, the dispute shall be settled by arbitration. The arbitration shall be conducted before a panel of three arbitrators. Each party shall select one arbitrator; the third arbitrator shall be appointed by the arbitrators selected by the parties. The arbitration shall be conducted in accordance with the Maine Uniform Arbitration Act ("MUAA"), except as otherwise provided in this section.
- b) The decision of the arbitrators shall be final and binding upon all parties. The decision may be entered in court as provided in the MUAA.
- c) The costs of the arbitration, including the arbitrators' fees shall be borne equally by the parties to the arbitration, unless the arbitrator orders otherwise.
- d) In any arbitration between the Owner and the Architect, the Owner has the right to consolidate related claims between Owner and Contractor.

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Wage Determination Schedule

PART 1- GENERAL

1.1 Related Documents

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specifications Sections, apply to this Section.

1.2 Summary

- A. This Section includes the wage determination requirements for Contractors as issued by the State of Maine Department of Labor Bureau of Labor Standards or the United States Department of Labor.

1.3 Requirements

- A. Conform to the wage determination schedule for this project which is shown on the following page.

PART 2 - PRODUCTS (not used)

PART 3 - EXECUTION (not used)

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Wage Determination Schedule

THIS DOCUMENT MUST BE CLEARLY POSTED AT THE PERTAINING STATE FUNDED PREVAILING WAGE CONSTRUCTION SITE

State of Maine
Department of Labor
Bureau of Labor Standards
Wage and Hour Division
Augusta, Maine 04333-0045
Telephone (207) 623-7906

Wage Determination - In accordance with 26 MRSA §1301 et. seq., this is a determination by the Bureau of Labor Standards, of the fair minimum wage rate to be paid laborers and workers employed on the below titled project.

Title of Project ----- State of Maine Parking Garage Restoration

Location of Project - Augusta, Kennebec County

2014 Fair Minimum Wage Rates
Building 2 Kennebec County
(other than 1 or 2 family homes)

Occupation Title	Minimum Wage	Minimum Benefit	Total	Occupation Title	Minimum Wage	Minimum Benefit	Total
Asbestos/Lead Removal Worker	\$12.00	\$0.38	\$12.38	Ironworker - Structural	\$23.29	\$5.79	\$29.08
Backhoe Loader Operator	\$18.00	\$2.43	\$20.43	Laborers (Incl. Helpers & Tenders)	\$12.00	\$0.25	\$12.25
Boom Truck (Truck Crane) Operator	\$26.50	\$15.46	\$41.96	Laborer - Skilled	\$16.75	\$3.05	\$19.80
Bricklayer	\$24.27	\$3.18	\$27.45	Loader Operator - Front-End	\$17.88	\$3.12	\$21.00
Bulldozer Operator	\$17.98	\$2.55	\$20.53	Mechanic- Maintenance	\$21.00	\$1.05	\$22.05
Carpenter	\$18.00	\$1.95	\$19.95	Mechanic- Refrigeration	\$22.94	\$3.84	\$26.78
Carpenter - Acoustical	\$13.75	\$3.24	\$16.99	Millwright	\$25.58	\$17.85	\$43.43
Carpenter - Rough	\$15.35	\$1.68	\$17.03	Oil/Fuel Burner Servicer & Installer (Licensed)	\$21.86	\$5.45	\$27.31
Cement Mason/Finisher	\$18.00	\$0.47	\$18.47	Painter	\$13.50	\$0.00	\$13.50
Communication Equip Installer	\$22.00	\$3.81	\$25.81	Paver Operator	\$17.25	\$1.63	\$18.88
Concrete Pump Operator	\$20.50	\$3.53	\$24.03	Pipe/Steam/Sprinkler Fitter	\$25.00	\$13.84	\$38.84
Crane Operator <15 Tons	\$19.50	\$4.66	\$24.16	Plumber (Licensed)	\$25.15	\$3.68	\$28.83
Crane Operator =>15 Tons	\$23.00	\$5.01	\$28.01	Plumber Helper/Trainee (Licensed)	\$18.03	\$2.57	\$20.60
Crusher Plant Operator	\$17.00	\$4.06	\$21.06	Propane & Natural Gas Servicer & Inst	\$23.00	\$3.44	\$26.44
Driller - Well	\$14.00	\$8.20	\$17.20	Pump Installer	\$21.00	\$2.77	\$23.77
Dry-Wall Applicator	\$20.00	\$0.96	\$20.96	Rigger	\$20.00	\$5.83	\$25.83
Dry-Wall Taper & Finisher	\$19.00	\$0.96	\$19.96	Roller Operator - Pavement	\$17.25	\$5.41	\$22.66
Electrician - Licensed	\$25.57	\$7.75	\$33.32	Roofer	\$15.00	\$1.98	\$16.98
Electrician Helper/Cable Puller (Licensed)	\$15.00	\$2.30	\$17.30	Sheet Metal Worker	\$16.50	\$4.49	\$20.99
Elevator Constructor/Installer	\$51.42	\$31.09	\$82.51	Slider	\$16.00	\$1.11	\$17.11
Excavator Operator	\$19.00	\$2.00	\$21.00	Stone Mason	\$20.00	\$0.77	\$20.77
Flagger	\$11.50	\$0.00	\$11.50	Tile Setter	\$22.05	\$3.73	\$25.78
Floor Layer	\$15.70	\$1.96	\$17.66	Truck Driver - Light	\$16.00	\$4.13	\$20.13
Glazier	\$23.00	\$2.67	\$25.67	Truck Driver - Medium	\$15.00	\$1.30	\$16.30
HVAC	\$20.32	\$5.10	\$25.42	Truck Driver - Heavy	\$14.50	\$0.51	\$15.01
Insulation Installer	\$19.00	\$3.24	\$22.24	Truck Driver - Tractor Trailer	\$16.00	\$4.21	\$20.21
Ironworker - Reinforcing	\$20.88	\$1.00	\$21.88	Truck Driver - Mixer (Cement)	\$13.25	\$0.84	\$14.12

The Laborer classifications include a wide range of work duties. Therefore, if any specific occupation to be employed on this project is not listed in this determination, call the Bureau of Labor Standards at the above number for further clarification.

Welders are classified in the trade to which the welding is incidental.

Apprentices - The minimum wage rate for registered apprentices are those set forth in the standards and policies of the Maine State Apprenticeship and Training Council for approved apprenticeship programs.

Posting of Schedule - Posting of this schedule is required in accordance with 26 MRSA §1301 et. seq., by any contractor holding a State contract for construction valued at \$50,000 or more and any subcontractors to such a contractor.

Appeal - Any person affected by the determination of these rates may appeal to the Commissioner of Labor by filing a written notice with the Commissioner stating the specific grounds of the objection within ten (10) days from the filing of these rates with the Secretary of State.

Determination No: **02-093-2014**


Filing Date: **July 29, 2014**

Expiration Date: **12-31-2014**

BL5 424BU (R2014) (Building 2 Kennebec)

A true copy

Attest:


Philip DeCicco
Director of Operations
Maine Department of Labor

End of Section 00 73 46

SECTION 011110 - SUMMARY OF WORK - RESTORATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification Sections apply to this Section.

1.2 PROJECT DESCRIPTION

- A. Work will be performed at locations within parking structure as shown on Drawings.
- B. Work required in these areas and estimated quantities are listed on Bid Form. Bid Quantities associated with Work Items listed on Drawings have been estimated and are subject to measurement as defined in Article "Measurements." Where additional Work Items are described, but not specifically located and/or shown on Drawings, Contractor shall be responsible for locating and marking areas to be repaired. Owner and/or Engineer/Architect reserves right to increase or decrease quantities up to 25% at same unit cost, as required by job conditions. Unit costs will be established in accordance with Supplementary Conditions, Article "Changes" for quantity variations exceeding 25%.
- C. Work Item specifications and details shall govern all repair operations. Locations where Work Items apply are shown on Drawings as symbols.
- D. Final payment shall be made on basis of actual approved Work performed as measured in place.
- E. Project consists of the following restoration work to be performed at the State of Maine Parking Garage in Augusta, ME:
 - 1. Restoration work shall be performed on this three level post-tensioned parking structure that shall include but not be limited to the following: concrete repairs to the delaminated and scaled floor areas and soffit, concrete column repairs, epoxy injection of column cracks, column top waterproofing, fabrication and installation of structural angles at post-tension tendon repair locations, re-application of traffic topping waterproofing membrane and sealants to designated floor areas, application of penetrating concrete sealer to designated floor areas, remove and replace floor joint sealant at designated floor areas, expansion joint seal replacement at designated stairtower areas, and other miscellaneous maintenance work to complete the project. Alternate work items included for bidding this project consists of cleaning and sealing of the façade on all elevations and levels of this structure.

2. MEASUREMENTS

- F. Before ordering any material or doing any Work, Contractor shall verify all measurements at Project site and shall be responsible for correctness of same.
- G. Before proceeding with each Work Item, Contractor shall locate, mark, and measure quantity of each item and report quantities to Engineer/Architect. If measured quantities exceed Engineer/Architect's estimate, Contractor shall obtain written authorization to proceed from Owner before executing Work required for that Work Item.
- H. Measurement of quantities for individual Work Items will be performed by Contractor and reviewed by Engineer/Architect. Coordinate measurements with inspection as required in Section "Project Management and Coordination."
- I. Cost of Work included in each Work Item for quantities as indicated in Contract Documents shall be included in Base Bid.
 - 1. Additions to or deductions from lump sum price for quantities of each Work Item added to or deducted from Work respectively shall be at unit prices indicated in Bid Form and shall constitute payment or deductions in full for all material, equipment, labor, supervision and incidentals necessary to complete Work.

1.3 WORK SEQUENCE

- A. Prior to commencement of work, meet with Engineer/Architect and Owner representatives to establish sequence and schedule of Work. Contractor shall give Owner notice of areas to be cleared of cars at least 2 working days in advance of actual Work.
- B. Contractor shall notify Owner's representative at least 24 hr prior to beginning any abrasive blasting operations.
- C. Contractor shall remove all broken concrete and debris from Work area on daily basis and dispose of same at authorized dump sites.
- D. Contractor shall remove dust and air transported sand/debris from remainder of facility at conclusion of operations in Work area.

1.4 CONTRACTOR USE OF PREMISES

- A. General: During the construction period Contractor shall have full use of premises for construction operations, including use of site. Contractor's use of premises is limited only by Owner's right to have access to grade level parking that is unaffected by the garage repair work and access to storage areas (enclosed) within the garage.
 - 1. Keep driveways and entrances serving the premises clear and available to the Owner at all times. Do not use these areas for parking or storage of materials.

- B. The contractor will have full availability of the top and second levels during construction period to allow the work to progress and be completed on or before the date under contract or before inclement weather occurs that prevents some or all of the work to be completed.
- C. Contractor shall be permitted to use on site utilities available at no cost to the contractor.
- D. Contractor's debris removal path shall be over non-repaired services unless physical restraints prevent use of such path.
- E. Contractor shall confine its apparatus, materials, equipment, tool cribs, field offices and operations to areas designated by Owner and/or Engineer/Architect. Premises shall not be unreasonably encumbered with materials and equipment. Neat and orderly stockpiling and other operations shall be maintained and debris shall be regularly removed from site. Contractor shall not load or permit any part of structure to be loaded with weight that will endanger structural integrity or safety of facility. Contractor shall limit axle loads to maximum 4000 lb per axle and gross weight of 8000 lb, or stockpiling of materials and equipment to 50 lb per sq ft. Contractor to note existing height restrictions within parking structure.
- F. On-Site Storage: Contractor shall not store materials or equipment at site of Work for more than one week prior to time that materials or equipment are incorporated into Work.

1.5 BARRICADES

- A. Provide positive barricading to separate Work areas from areas open to public and to prevent the need for washing cars parked adjacent to the work area. Minimum acceptable separation: 4 ft. 0 in. high solid temporary barrier constructed of wood or concrete. Provide additional barriers as required to prevent damage to vehicle due to airborne debris. See "Temporary Facilities" for additional requirements.

1.6 TRAFFIC OFFICERS AND FLAGMEN

- A. When, in Owner's opinion, it is necessary that uniformed police or security officers be used to protect and control pedestrian traffic, to direct vehicular traffic during construction and to keep traffic off any part of Work, or to protect public safety, a police/security detail will be obtained.

1.7 CLAIMS

- A. Contractor shall promptly address all damages claims. Owner reserves right to resolve any claims not addressed by Contractor within 3 wks after claim is received by Contractor. Any amounts paid by Owner will be deducted from Contractor's next progress payment.

1.8 MISCELLANEOUS PROVISIONS

- A. Environmental Performance: In order to secure approval to proceed with construction, Owner committed to comply with terms of an "Environmental Impact Statement" dated May 4, 1987. A copy of this Statement shall be transmitted to Contractor prior to execution of the Owner-Contractor Agreement. Project has been designed and Contract Documents prepared with the intention that resulting Work will comply with terms of that Statement.

PART 2 - PRODUCTS (NOT APPLICABLE)

END OF SECTION 011110

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SECTION 012300 – ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification Sections apply to this Section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for Alternates.
- B. Definition: An Alternate is an amount proposed by Bidders and stated on Bid Form for certain construction activities defined in Bidding Requirements that may be added to or deducted from Base Bid amount if Owner decides to accept corresponding change in either amount of construction to be completed, or in products, materials, equipment, systems or installation methods described in Contract Documents.
- C. Coordination: Coordinate related Work and modify or adjust adjacent Work as necessary to ensure that Work affected by each accepted Alternate is complete and fully integrated into project.
- D. Notification: Immediately following award of Contract, prepare and distribute to each party involved notification of status of each Alternate. Indicate whether Alternates have been accepted, rejected or deferred for consideration at later date. Include complete description of negotiated modifications to Alternates.
- E. Schedule: "Schedule of Alternates" is included at end of this Section. Specification Sections referenced in Schedule contain requirements for materials and methods necessary to achieve Work described under each Alternate.
 - 1. Include as part of each Alternate, miscellaneous devices, accessory objects and similar items incidental to or required for complete installation whether or not mentioned as part of Alternate.

PART 2 - PRODUCTS (NOT APPLICABLE).

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

END OF SECTION 012300

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SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification Sections apply to this Section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling and processing contract modifications.
- B. Related Sections: Following Sections contain requirements that relate to this Section:
 - 1. Division 01 Section "Allowances" for procedural requirements governing the handling and processing of allowances.
 - 2. Division 01 Section "Unit Prices" for administrative requirements governing use of unit prices.
 - 3. Division 01 Section "Submittal Procedures" for requirements for Contractor's Construction Schedule.
 - 4. Division 01 Section "Payment Procedures" for administrative procedures governing applications for payment.
 - 5. Division 01 Section "Product Substitution Procedures" for administrative procedures for handling requests for substitutions made after award of Contract.

1.3 CHANGE ORDER PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Proposed changes in Work that will require adjustment to Contract Sum or Contract Time will be issued by Engineer/Architect, with detailed description of proposed change and supplemental or revised Drawings and Specifications, if necessary.
 - 1. Proposal requests issued by Engineer/Architect are for information only. Do not consider them instruction either to stop work in progress, or to execute proposed change.
 - 2. Unless otherwise indicated in proposal request, within 20 days of receipt of proposal request, submit to Engineer/Architect for Owner's review an estimate of cost necessary to execute proposed change.
 - a. Include list of quantities of products to be purchased and unit costs, along with total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.

- b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include statement indicating effect proposed change in Work will have on Contract Time.
- B. Contractor-Initiated Change Order Proposal Requests: When latent or other unforeseen conditions require modifications to Contract, Contractor may propose changes by submitting request for change to Engineer/Architect.
 - 1. Include statement outlining reasons for change and effect of change on Work. Provide complete description of proposed change. Indicate effect of proposed change on Contract Sum and Contract Time.
 - 2. Include list of quantities of products to be purchased and unit costs along with total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.
 - 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - 4. Comply with requirements in Section "Product Substitutions" if proposed change in Work.
 - 5. Submit request no later than 10 working days after discovery of condition.
- C. Proposal Request Form: Use AIA Document G709 for Change Order Proposal Requests.

1.4 ALLOWANCES

- A. Allowance Adjustment: Base each Change Order Proposal Request for an allowance cost adjustment solely on difference between actual purchase amount and allowance, multiplied by final measurement of work-in-place, with reasonable allowances, where applicable, for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.
 - 1. Include installation costs in purchase amount only where indicated as part of the allowance.
 - 2. When requested, prepare explanations and documentation to substantiate margins claimed.
- B. Submit claims for increased costs because of change in scope or nature of allowance described in Contract Documents, whether for purchase order amount or Contractor's handling, labor, installation, overhead, and profit, within 20 days of receipt of Change Order or construction change directive authorizing Work to proceed. Claims submitted later than 20 days will be rejected.
 - 1. Change Order cost amount shall not include Contractor's or Subcontractor's indirect expense except when it is clearly demonstrated that either nature or scope of Work required was changed from that which could have been foreseen from description of allowance and other information in Contract Documents.

2. No change to Contractor's indirect expense is permitted for selection of higher or lower priced materials or systems of same scope and nature as originally indicated.

1.5 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: When Owner and Contractor are not in total agreement on terms of Change Order Proposal Request, Engineer/Architect may issue Construction Change Directive on AIA Form G714, instructing Contractor to proceed with change in Work, for subsequent inclusion in Change Order.
- B. Construction Change Directive will contain complete description of change in Work and designate method to be followed to determine change in Contract Sum or Contract Time.
- C. Documentation: Maintain detailed records on time and material basis of work required by Construction Change Directive.
 1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to Contract.

1.6 CHANGE ORDER PROCEDURES

- A. Upon Owner's approval of Change Order Proposal Request, Engineer/Architect will issue Change Order for signatures of Owner and Contractor on AIA Form G701, as provided in Conditions of Contract.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION 012600

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SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Sections include the following:
 - 1. Division 01 Section "Allowances" for procedural requirements governing handling and processing of allowances.
 - 2. Division 01 Section "Unit Prices" for administrative requirements governing use of unit prices.
 - 3. Division 01 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
 - 4. Division 01 Section "Construction Progress Documentation" for administrative requirements governing preparation and submittal of Contractor's Construction Schedule and Submittals Schedule.

1.3 DEFINITIONS

- A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.
 - 1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with Continuation Sheets.
 - b. Submittals Schedule.

2. Submit the Schedule of Values to Engineer at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
- B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section.
1. Identification: Include the following Project identification on the Schedule of Values:
 - a. Project name, location,
 - b. Owner project number,
 - c. Name of Engineer.
 - d. Engineer's project number.
 - e. Contractor's name and address.
 - f. Date of submittal.
 2. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of the Work.
 - c. Name of subcontractor.
 - d. Name of manufacturer or fabricator.
 - e. Change Orders (numbers) that affect value.
 - f. Dollar value.
 - 1) Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
 3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate.
 4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
 5. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site. Include evidence of insurance or bonded warehousing if required.
 6. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
 7. Allowances: Provide a separate line item in the Schedule of Values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit

- cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
8. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.
 9. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by Engineer] and paid for by Owner.
 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction Work covered by each Application for Payment is the period indicated in the Agreement.
- C. Payment Application Forms: Use AIA Document G702 and AIA Document G703 Continuation Sheets as form for Applications for Payment.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Engineer will return incomplete applications without action.
 1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
 2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- E. Transmittal: Submit 3 signed and notarized original copies of each Application for Payment to Engineer by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.
 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- F. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from every entity who is lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.

- G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's liens from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.
1. Submit partial waivers on each item for amount requested, before deduction for retainage, on each item.
 2. When an application shows completion of an item, submit final or full waivers.
 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 4. Waiver Delays: Submit each Application for Payment with Contractor's waiver of mechanic's lien for construction period covered by the application.
 - a. Submit final Application for Payment with or preceded by final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
- H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
 2. Schedule of Values.
 3. Contractor's Construction Schedule (preliminary if not final).
 4. Products list.
 5. Schedule of unit prices.
 6. Submittals Schedule (preliminary if not final).
 7. List of Contractor's staff assignments.
 8. Initial progress report.
 9. Report of preconstruction conference.
 10. Certificates of insurance and insurance policies.
 11. Performance and payment bonds.
 12. Data needed to acquire Owner's insurance.
- I. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- J. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 3. Updated final statement, accounting for final changes to the Contract Sum.
 4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."

5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
6. Final, liquidated damages settlement statement.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION 012900

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SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. General project coordination procedures.
 - 2. Administrative and supervisory personnel.
 - 3. Project meetings.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 01 Section "Construction Progress Documentation" for preparing and submitting the Contractor's Construction Schedule.
 - 2. Division 01 Section "Closeout Procedures" for coordinating Contract closeout.

1.3 COORDINATION

- A. Coordination: Coordinate construction operations included in various Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. If necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 1. Preparation of Contractor's Construction Schedule.
 2. Preparation of the Schedule of Values.
 3. Installation and removal of temporary facilities and controls.
 4. Delivery and processing of submittals.
 5. Progress meetings.
 6. Project closeout activities.

1.4 ADMINISTRATIVE AND SUPERVISORY PERSONNEL

- A. General: In addition to Project superintendent, provide other administrative and supervisory personnel as required for proper performance of the Work.
 1. Include special personnel required for coordination of operations with other contractors.

1.5 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.
 1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Engineer of scheduled meeting dates and times.
 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
 3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Engineer, within **3** days of the meeting.
- B. Preconstruction Conference: Schedule a preconstruction conference before starting construction, at a time convenient to Owner and Engineer, but no later than 15 days after execution of the Agreement. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.
 1. Attendees: Authorized representatives of Owner, Engineer, and their consultants; Contractor and its superintendent; major subcontractors; manufacturers; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.

2. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Tentative construction schedule.
 - b. Phasing.
 - c. Critical work sequencing.
 - d. Designation of responsible personnel.
 - e. Procedures for processing field decisions and Change Orders.
 - f. Procedures for processing Applications for Payment.
 - g. Distribution of the Contract Documents.
 - h. Submittal procedures.
 - i. Preparation of Record Documents.
 - j. Use of the premises.
 - k. Responsibility for temporary facilities and controls.
 - l. Work, and storage areas.
 - m. Equipment deliveries and priorities.
 - n. First aid.
 - o. Security.
 - p. Progress cleaning.
 - q. Working hours.
- C. Progress Meetings: Conduct progress meetings at appropriate intervals. Coordinate dates of meetings with preparation of payment requests.
 1. Attendees: In addition to representatives of Owner, and Engineer, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - b. Review present and future needs of each entity present, including the following:
 - 1) Status of submittals.
 - 2) Deliveries.
 - 3) Off-site fabrication.
 - 4) Access.
 - 5) Site utilization.
 - 6) Temporary facilities and controls.
 - 7) Work hours.
 - 8) Hazards and risks.

- 9) Progress cleaning.
 - 10) Quality and work standards.
 - 11) Change Orders.
 - 12) Documentation of information for payment requests.
- 3. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.
 - a. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION 013100

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SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Preliminary Construction Schedule.
 - 2. Contractor's Construction Schedule.
 - 3. Construction schedule updating.
 - 4. Submittals Schedule.
 - 5. Field condition reports.
- B. Related Sections include the following:
 - 1. Division 01 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes.
 - 2. Division 01 Section "Submittal Procedures" for submitting schedules and reports.
 - 3. Division 01 Section "Quality Control" for submitting a schedule of tests and inspections.
 - 4. Division 01 Section "Closeout Procedures" for submitting photographic negatives as Project Record Documents at Project closeout.

1.3 SUBMITTALS

- A. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of Engineers and owners, and other information specified.
- B. Submittals Schedule: Submit three copies of schedule. Arrange the following information in a tabular format:
 - 1. Scheduled date for first submittal.
 - 2. Specification Section number and title.
 - 3. Submittal category (action or informational).
 - 4. Name of subcontractor.

5. Description of the Work covered.
 6. Scheduled date for Engineer's final release or approval.
- C. Preliminary Construction Schedule: Submit two printed copies; one a single sheet of reproducible media, and one a print.
- D. Contractor's Construction Schedule: Submit two printed copies of initial schedule, one a reproducible print and one a blue- or black-line print, large enough to show entire schedule for entire construction period.
- E. Field Condition Reports: Submit two copies at time of discovery of differing conditions.

PART 2 - PRODUCTS

2.1 SUBMITTALS SCHEDULE

- A. Preparation: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, resubmittal, ordering, manufacturing, fabrication, and delivery when establishing dates.
1. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Values, and Contractor's Construction Schedule.
 2. Initial Submittal: Submit concurrently with preliminary bar-chart schedule. Include submittals required during the first 60 days of construction. List those required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
 - a. At Contractor's option, show submittals on the Preliminary Construction Schedule, instead of tabulating them separately.
 3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's Construction Schedule.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Procedures: Comply with procedures contained in AGC's "Construction Planning & Scheduling."
- B. Time Frame: Extend schedule from date established for commencement of the Work to date of Final Completion.
1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- C. Activities: Treat each story or separate area as a separate numbered activity for each principal element of the Work. Comply with the following:

1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Engineer.
 2. Submittal Review Time: Include review and resubmittal times indicated in Division 01 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
 3. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Engineer's administrative procedures necessary for certification of Substantial Completion.
- D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
1. Phasing: Arrange list of activities on schedule by phase.
 2. Work Restrictions: Show the effect of the following items on the schedule:
 - a. Limitations of continued occupancies.
 - b. Partial occupancy before Substantial Completion.
 - c. Use of premises restrictions.
 3. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
 - a. Submittals.
 - b. Deliveries.
 - c. Installation.
 - d. Adjusting.
 - e. Curing.
- E. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and Final Completion.
- F. Cost Correlation: At the head of schedule, provide a cost correlation line, indicating planned and actual costs. On the line, show dollar volume of the Work performed as of dates used for preparation of payment requests.
1. Refer to Division 01 Section "Payment Procedures" for cost reporting and payment procedures.
- G. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using fragnets to demonstrate the effect of the proposed change on the overall project schedule.

2.3 PRELIMINARY CONSTRUCTION SCHEDULE

- A. Bar-Chart Schedule: Submit preliminary horizontal bar-chart-type construction schedule within seven days of date established for commencement of the Work.

- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first **30** days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

2.4 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Schedule: Submit a comprehensive, fully developed, Contractor's Construction Schedule within 30 days of date established for the Commencement of Work. Base schedule on the Preliminary Construction Schedule and whatever updating and feedback was received since the start of Project.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.
 - 1. Schedule shall reflect the dates and anticipated time for each Phase of the work as outlined on the Drawings.
- C. **Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. The report should provide a two week look ahead at anticipated construction activities including any phase changes.**

2.5 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
 - 1. List of subcontractors at Project site.
 - 2. Approximate count of personnel at Project site.
 - 3. High and low temperatures and general weather conditions.
 - 4. Accidents.
 - 5. Meetings and significant decisions.
 - 6. Unusual events (refer to special reports).
 - 7. Stoppages, delays, shortages, and losses.
 - 8. Emergency procedures.
 - 9. Orders and requests of authorities having jurisdiction.
 - 10. Change Orders received and implemented.
 - 11. Construction Change Directives received.
 - 12. Services connected and disconnected.
 - 13. Equipment or system tests and startups.
 - 14. Substantial Completions authorized.
- B. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare a detailed report. Submit with a request for information on CSI Form 13.2A. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: At bi-monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
 - 1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 - 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in durations, actual starts and finishes, and activity durations.
- B. Distribution: Distribute copies of approved schedule to Engineer, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
 - 1. Post copies in Project meeting rooms and temporary field offices.
 - 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 013200

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SECTION 013300 - SUBMITTAL PROCEDURES

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. Related Requirements:
 - 1. Division 01 Section "Payment Procedures" For submitting Applications for Payment and the schedule of values.
 - 2. Division 01 Section "Project Management and Coordination" for submitting Coordination Drawings.
 - 3. Division 01 Section "Quality Control" for submitting test and inspection reports .
 - 4. Division 01 Section "Closeout Procedures" for submitting warranties.
 - 5. Division 01 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.

1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Engineer's responsive action.
- B. Informational Submittals: Written and graphic information and physical samples that do not require Engineer's approval. Submittals may be rejected for not complying with requirements.
- C. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.
- D. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.4 ACTION SUBMITTALS

- A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Engineer and additional time for handling and reviewing submittals required by those corrections.
1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
 2. Initial Submittal: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
 3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.
 - a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.
 4. Format: Arrange the following information in a tabular format:
 - a. Scheduled date for first submittal.
 - b. Specification Section number and title.
 - c. Submittal category: Action; informational.
 - d. Name of subcontractor.
 - e. Description of the Work covered.
 - f. Scheduled date for Engineer's final release or approval.
 - g. Scheduled date of fabrication.

1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. Engineer's Digital Data Files: Electronic digital data files of the Contract Drawings will be provided by Engineer for Contractor's use in preparing submittals.
1. Upon written request by the Contractor and execution of associated disclaimer forms and related documentation, the Contract Drawings will be provided to the Contractor for use in preparation of record drawings and submittals. Drawing files will be transmitted one time to the Contractor at the start of construction. This version of the drawings is provided only as a courtesy and convenience and Engineer makes no representations as to their accuracy or completeness as they relate to the Contract Documents.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

- a. Engineer reserve the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Engineer's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
 1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. Engineer will advise Contractor when a submittal being processed must be delayed for coordination.
 2. If intermediate submittal is necessary, process it in same manner as initial submittal.
 3. Allow 15 days for processing each resubmittal.
- D. Paper Submittals: Place a permanent label or title block on each submittal for identification.
 1. Indicate name of firm or entity that prepared each submittal on label or title block.
 2. Provide a space approximately 4 by 5 inches on label or beside title block to record Contractor's review and approval markings and action taken by Engineer .
 3. Include the following information for processing and recording action taken:
 - a. Project name.
 - b. Date.
 - c. Name and address of Engineer.
 - d. Name and address of Contractor.
 - e. Name and address of subcontractor.
 - f. Name and address of supplier.
 - g. Name of manufacturer.
 - h. Unique identifier, including revision number.
 - i. Number and title of appropriate Specification Section.
 - j. Drawing number and detail references, as appropriate.
 - k. Location(s) where product is to be installed, as appropriate.
 - l. Other necessary identification.
 4. Additional Paper Copies: Unless additional copies are required for final submittal, and unless Engineer observes noncompliance with provisions of the Contract Documents, initial submittal may serve as final submittal.
 - a. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Engineer
 - b. Additional copies submitted for maintenance manuals will **[not]** be marked with action taken and will be returned.
 5. Transmittal for Paper Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a

transmittal form. Engineer] will discard submittals received from sources other than Contractor.

- a. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Engineer] on previous submittals, and deviations from requirements of the Contract Documents, including minor variations and limitations. Include the same label information as the related submittal.
- b. Include Contractor's certification stating that information submitted complies with requirements of the Contract Documents.
- c. Transmittal Form: Use [AIA Document G810] [CSI Form 12.1A].
- d. Transmittal Form: Provide locations on form for the following information:
 - 1) Project name.
 - 2) Date.
 - 3) Destination (To:).
 - 4) Source (From:).
 - 5) Names of subcontractor, manufacturer, and supplier.
 - 6) Category and type of submittal.
 - 7) Submittal purpose and description.
 - 8) Submittal and transmittal distribution record.
 - 9) Remarks.
 - 10) Signature of transmitter.

E. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:

1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
2. Name file with submittal number or other unique identifier, including revision identifier.
 - a. File name shall use project identifier and Specification Section number followed by a decimal point and then a sequential number (e.g., LNHS-061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., LNHS-061000.01.A).
3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Engineer]
4. Transmittal Form for Electronic Submittals: Use software-generated form from electronic project management software acceptable to Owner, containing the following information:
 - a. Project name.
 - b. Date.
 - c. Destination (To:).
 - d. Source (From:).
 - e. Names of subcontractor, manufacturer, and supplier.
 - f. Category and type of submittal.

- g. Submittal purpose and description.
 - h. Submittal and transmittal distribution record.
 - i. Remarks.
 - j. Signature of transmitter.
- 5. Metadata: Include the following information as keywords in the electronic submittal file metadata:
 - a. Project name.
 - b. Number and title of appropriate Specification Section.
 - c. Manufacturer name.
 - d. Product name.
 - e. <Insert required information>.
- F. Options: Identify options requiring selection by Engineer.
- G. Deviations: Highlight, encircle, or otherwise identify deviations from the Contract Documents on submittals.
- H. Resubmittals: Engineer will review each of Contractor's shop drawings and/or submittal data the initial time and, should resubmittal be required, one additional time to verify that reasons for resubmittal have been addressed by Contractor and corrections made. Resubmittal changes/revisions/corrections shall be circled. Engineer will review only circled items and will not be responsible for non-circled changes/revisions/corrections and additions. Should additional resubmittals be required, Contractor shall reimburse Owner for all costs incurred, including the cost of Engineer's services made necessary to review such additional resubmittals. Owner will in turn reimburse Engineer.
- I. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- J. Use for Construction: Use only final submittals that are marked with approval notation from Engineer's action stamp.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

- A. General: Prepare and submit Action Submittals required by individual Specification Sections by the following method.
 - 1. Submit three copies of paper submittals unless otherwise indicated. Engineer, will return two copies.
 - 2. Submit electronic submittals as PDF electronic files. Engineer, will return annotated file.

- a. Post directly to Engineer's FTP site specifically established for Project when file size is larger than 5 megabytes.
 - b. Submit via email when file size is smaller than 5 megabytes.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
 1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
 2. Mark each copy of each submittal to show which products and options are applicable.
 3. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts.
 - b. Manufacturer's product specifications.
 - c. Standard color charts.
 - d. Statement of compliance with specified reference standards.
 - e. Testing by recognized testing agency.
 - f. Application of testing agency labels and seals.
 - g. Notation of coordination requirements.
 - h. Availability and delivery time information.
 - i. Mill reports.
 4. For equipment, include the following in addition to the above, as applicable.
 - a. Wiring diagrams showing factory-installed wiring.
 - b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
 5. Submit Product Data before or concurrent with Samples.
 6. Submit Product Data in either of the following format]:Retain one or both subparagraphs below unless default submittal format specified elsewhere in this article applies.
 - a. Three paper copies of each submittal. Engineer[,] will return two copies.
 - b. PDF electronic file.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data, unless submittal based on Engineers digital data drawing files is otherwise permitted.
 1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Dimensions.
 - b. Identification of products.
 - c. Fabrication and installation drawings.

- d. Roughing-in and setting diagrams.
 - e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
 - f. Shopwork manufacturing instructions.
 - g. Templates and patterns.
 - h. Schedules.
 - i. Design calculations.
 - j. Compliance with specified standards.
 - k. Notation of coordination requirements.
 - l. Notation of dimensions established by field measurement.
 2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 30 by 40 inches.
 3. Submit Shop Drawings in the following format:
 - a. Three paper copies of each submittal. Engineer[, will return two copies.
 - b. Or PDF electronic file.
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
 1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 2. Identification: Attach label on unexposed side of Samples that includes the following:
 - a. Generic description of Sample.
 - b. Product name and name of manufacturer.
 - c. Sample source.
 - d. Number and title of applicable Specification Section.
 - e. Specification paragraph number and generic name of each item.
 3. For projects where electronic submittals are required, provide corresponding electronic submittal of Sample transmittal, digital image file illustrating Sample characteristics, and identification information for record.
 4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit one full set of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Engineer, will return submittal with options selected.
- E. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
 1. Name, address, and telephone number of entity performing subcontract or supplying products.
 2. Number and title of related Specification Section(s) covered by subcontract.
 3. Drawing number and detail references, as appropriate, covered by subcontract.

2.2 INFORMATIONAL SUBMITTALS

- A. General: Prepare and submit Informational Submittals required by individual Specification Sections by the following method.
 1. Submit two copies of paper submittals. Engineer, will not return copies.
 2. Submit electronic submittals as PDF electronic files. Engineer[, will not return annotated file.
 - a. Post directly to Engineer's FTP site specifically established for Project when file size is larger than 5 megabytes .
 - b. Submit via email when file size is smaller than 5 megabytes.
- B. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
 1. Provide a digital signature with digital certificate on electronically submitted certificates and certifications where indicated.
 2. Provide a notarized statement on original paper copy certificates and certifications where indicated.
- C. Qualification Data: Prepare and submit written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of Engineers and owners, and other information specified.
- D. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of

Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.

- E. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
- F. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- G. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- H. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- I. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- J. Product Test Reports: Submit written reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- K. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
 - 1. Name of evaluation organization.
 - 2. Date of evaluation.
 - 3. Time period when report is in effect.
 - 4. Product and manufacturers' names.
 - 5. Description of product.
 - 6. Test procedures and results.
 - 7. Limitations of use.
- L. Preconstruction Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
- M. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- N. Field Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed

either during product installation or after product installation in its final location, for compliance with requirements in the Contract Documents.

- O. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.
- P. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer. Include the following, as applicable:
 - 1. Preparation of substrates.
 - 2. Required substrate tolerances.
 - 3. Sequence of installation or erection.
 - 4. Required installation tolerances.
 - 5. Required adjustments.
 - 6. Recommendations for cleaning and protection.
- Q. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:
 - 1. Name, address, and telephone number of factory-authorized service representative making report.
 - 2. Statement on condition of substrates and their acceptability for installation of product.
 - 3. Statement that products at Project site comply with requirements.
 - 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 - 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 - 6. Statement whether conditions, products, and installation will affect warranty.
 - 7. Other required items indicated in individual Specification Sections.
- R. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.
- S. Material Safety Data Sheets: When requested, submit information directly to Owner. If submitted to Engineer, Engineer will not review this information but will return it with no action taken.

2.3 REQUESTS FOR INFORMATION

- A. Engineer reserves the right to reject, unprocessed, any Request for Information (RFI) that the Engineer, at its sole discretion, deems frivolous.

- B. Engineer reserves the right to reject, unprocessed, any RFI that the Engineer, at its sole discretion, deems already answered in the Contract Documents.
- C. RFI process shall not be used for requesting substitutions. Procedures for substitutions are clearly specified elsewhere in the contract documents.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Engineer.
- B. Project Closeout and Maintenance Material Submittals: See Requirements in Section 017700 "Closeout Procedures."
- C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ENGINEER'S [AND CONSTRUCTION MANAGER'S] ACTION

- A. General: Engineer will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Engineer or its subconsultant will review each submittal, make marks to indicate corrections or revisions required, and return it. Engineer will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
- C. Informational Submittals: Engineer will review each submittal and will not return it, or will return it if it does not comply with requirements. Engineer will forward each submittal to appropriate party.
- D. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Engineer.
- E. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- F. Submittals not required by the Contract Documents will not be reviewed and may be discarded.

END OF SECTION 013300

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SECTION 014200 - REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "approved," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.
- J.

1.3 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents, unless otherwise indicated.
- C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
 - 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.
- D. Abbreviations and Acronyms for Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. Names, telephone numbers, and Web-site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

ADAAG	Americans with Disabilities Act (ADA)	(800) 872-2253
	Architectural Barriers Act (ABA)	
	Accessibility Guidelines for Buildings and Facilities	(202) 272-0080
	Available from Access Board www.access-board.gov	
CFR	Code of Federal Regulations	(888) 293-6498
	Available from Government Printing Office	(202) 512-1530
	www.gpoaccess.gov/cfr/index.html	
CRD	Handbook for Concrete and Cement	
	Available from Army Corps of Engineers	
	Waterways Experiment Station www.wes.army.mil	(601) 634-2355
FED-STD	Federal Standard (See FS)	

1.4 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale Research's "Encyclopedia of Associations" or in Columbia Books' "National Trade & Professional Associations of the U.S."
- B. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in

the following list. Names, telephone numbers, and Web-site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

ACI	ACI International (American Concrete Institute) www.aci-int.org	(248) 848-3700
AGC	Associated General Contractors of America (The) www.agc.org	(703) 548-3118
AIA	American Institute of Architects (The) www.aia.org	(800) 242-3837 (202) 626-7300
AISC	American Institute of Steel Construction www.aisc.org	(800) 644-2400 (312) 670-2400
AISI	American Iron and Steel Institute www.steel.org	(202) 452-7100
ANSI	American National Standards Institute www.ansi.org	(202) 293-8020
ASTM	ASTM International (American Society for Testing and Materials International) www.astm.org	(610) 832-9585
AWS	American Welding Society www.aws.org	(800) 443-9353 (305) 443-9353
CRSI	Concrete Reinforcing Steel Institute www.crsi.org	(847) 517-1200
CSA	CSA International (Formerly: IAS - International Approval Services) www.csa-international.org	(800) 463-6727 (416) 747-4000
CSI	Construction Specifications Institute (The) www.csinet.org	(800) 689-2900 (703) 684-0300
CSSB	Cedar Shake & Shingle Bureau www.cedarbureau.org	(604) 820-7700
CTI	Cooling Technology Institute (Formerly: Cooling Tower Institute) www.cti.org	(281) 583-4087
DHI	Door and Hardware Institute	(703) 222-2010

	www.dhi.org	
EIA	Electronic Industries Alliance www.eia.org	(703) 907-7500
EIMA	EIFS Industry Members Association www.eima.com	(800) 294-3462 (770) 968-7945
EJCDC	Engineers Joint Contract Documents Committee www.asce.org	(800) 548-2723 (703) 295-6300
EJMA	Expansion Joint Manufacturers Association, Inc. www.ejma.org	(914) 332-0040
ESD	ESD Association www.esda.org	(315) 339-6937
FCI	Fluid Controls Institute www.fluidcontrolsintitute.org	(216) 241-7333
FIBA	Federation Internationale de Basketball Amateur (The International Basketball Federation) www.fiba.com	41 22 545 00 00
FIVB	Federation Internationale de Volleyball (The International Volleyball Federation) www.fivb.ch	41 21 345 35 35
FM	Factory Mutual System (Now FMG)	
FMG	FM Global (Formerly: FM - Factory Mutual System) www.fmglobal.com	(401) 275-3000
ICRI	International Concrete Repair Institute, Inc. www.icri.org	(847) 827-0830
NCMA	National Concrete Masonry Association www.ncma.org	(703) 713-1900
NCPI	National Clay Pipe Institute www.ncpi.org	(262) 248-9094
PTI	Post-Tensioning Institute www.post-tensioning.org	(602) 870-7540

SSPC	SSPC: The Society for Protective Coatings www.sspc.org	(877) 281-7772 (412) 281-2331
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C. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web-site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

BOCA	BOCA International, Inc. (See ICC)
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CABO	Council of American Building Officials (See ICC)
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IAPMO	International Association of Plumbing and Mechanical Officials www.iapmo.org	(909) 472-4100
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ICBO	International Conference of Building Officials (See ICC)
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ICBO ES	ICBO Evaluation Service, Inc. (See ICC-ES)
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ICC	International Code Council (Formerly: CABO - Council of American Building Officials) www.iccsafe.org	(703) 931-4533
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ICC-ES	ICC Evaluation Service, Inc. www.icc-es.org	(800) 423-6587 (562) 699-0543
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NES	National Evaluation Service (See ICC-ES)
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SBCCI	Southern Building Code Congress International, Inc. (See ICC)
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D. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web-site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

www.fcc.gov

NCHRP	National Cooperative Highway Research Program (See TRB)	
NIST	National Institute of Standards and Technology www.nist.gov	(301) 975-6478
OSHA	Occupational Safety & Health Administration www.osha.gov	(800) 321-6742 (202) 693-1999
PBS	Public Building Service (See GSA)	

- E. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web-site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 014200

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SECTION 014210 - REFERENCE STANDARDS AND DEFINITIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 DEFINITIONS

- A. General: Basic contract definitions are included in the Conditions of the Contract.
- B. "Indicated": The term "indicated" refers to graphic representations, notes, or schedules on the Drawings; or to other paragraphs or schedules in the Specifications and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the user locate the reference. Location is not limited.
- C. "Directed": Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean directed by the Design Professional, requested by the Design Professional, and similar phrases.
- D. "Approved": The term "approved," when used in conjunction with the Design Professional's action on the Contractor's submittals, applications, and requests, is limited to the Design Professional's duties and responsibilities as stated in the Conditions of the Contract.
- E. "Regulations": The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": The term "furnish" means to supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": The term "install" describes operations at the Project site including the actual unloading, temporary storage, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": The term "provide" means to furnish and install, complete and ready for the intended use.
- I. "Installer": An installer is the Contractor or another entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier, to perform a

particular construction activity, including installation, erection, application, or similar operations. Installers are required to be experienced in the operations they are engaged to perform.

1. The term "experienced," when used with the term "installer," means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with the special requirements indicated; and having complied with requirements of authorities having jurisdiction.
 2. Trades: Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.
 3. Assigning Specialists: Certain Sections of the Specifications require that specific construction activities shall be performed by specialists who are recognized experts in those operations. The specialists must be engaged for those activities, and their assignments are requirements over which the Contractor has no option. However, the ultimate responsibility for fulfilling contract requirements remains with the Contractor.
 - a. This requirement shall not be interpreted to conflict with enforcing building codes and similar regulations governing the Work. It is also not intended to interfere with local trade-union jurisdictional settlements and similar conventions.
- J. "Project site" is the space available to the Contractor for performing construction activities, either exclusively or in conjunction with others performing other work as part of the Project. The extent of the Project site is shown on the Drawings and may or may not be identical with the description of the land on which the Project is to be built.
- K. "Testing Agencies": A testing agency is an independent entity engaged to perform specific inspections or tests, either at the Project site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

1.3 SPECIFICATION FORMAT AND CONTENT EXPLANATION

- A. Specification Format: These Specifications are organized into Divisions and Sections based on the 16-Division format and CSI/CSC's "MasterFormat" numbering system.
- B. Specification Content: These Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be interpolated as the sense requires. Singular words shall be interpreted as plural and plural words interpreted as singular where applicable as the context of the Contract Documents indicates.

2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the Section Text, subjective language is used for clarity to describe responsibilities that must be fulfilled indirectly by the Contractor or by others when so noted.
 - a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

1.4 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of the date of the Contract Documents.
- C. Conflicting Requirements: Where compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to the Design Professional for a decision before proceeding.
 1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Refer uncertainties to the Design Professional for a decision before proceeding.
- D. Copies of Standards: Each entity engaged in construction on the Project must be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
 1. Where copies of standards are needed to perform a required construction activity, the Contractor shall obtain copies directly from the publication source and make them available on request.
- E. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. Where abbreviations and acronyms are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards-producing organization, authorities having jurisdiction, or other entity applicable to the context of the text provision. Refer to Gale Research's "Encyclopedia of Associations" or Columbia Books' "National Trade & Professional Associations of the U.S.," which are available in most libraries.

1.5 SUBMITTALS

- A. Permits, Licenses, and Certificates: For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION 014210

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SECTION 014500 - QUALITY CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification Sections apply to this Section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for quality control services.
- B. Quality control services include inspections, tests and related actions including reports, performed by independent agencies, governing authorities, and the Contractor. They do not include Contract enforcement activities performed by Engineer/Architect.
- C. Inspection and testing services are required to verify compliance with requirements specified or indicated. These services do not relieve the Contractor of responsibility for compliance with Contract Document requirements.
- D. Requirements of this Section relate to customized fabrication and installation procedures, not production of standard products.
 - 1. Specific quality control requirements for individual construction activities are specified in the Sections that specify those activities. Those requirements, including inspections and tests, cover production of standard products as well as customized fabrication and installation procedures.
 - 2. Inspections, tests and related actions specified are not intended to limit the Contractor's quality control procedures that facilitate compliance with Contract Document requirements.
 - 3. Requirements for the Contractor to provide quality control services required by Engineer/Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
- E. Related Sections: Following Sections contain requirements that relate to this Section:
 - 1. Division 01 Section "Cutting and Patching" specifies requirements for repair and restoration of construction disturbed by inspection and testing activities.
 - 2. Division 01 Section "Submittal Procedures" specifies requirements for development of a schedule of required tests and inspections.

1.3 RESPONSIBILITIES

A. Contractor Responsibilities:

1. Retesting: Contractor is responsible for retesting where results of required inspections, tests or similar services prove unsatisfactory and do not indicate compliance with Contract Document requirements, regardless of whether the original test was the Contractor's responsibility.
 - a. Cost of retesting construction revised or replaced by the Contractor is the Contractor's responsibility, where required tests were performed on original construction.
2. Associated Services: Cooperate with agencies performing required inspections, tests and similar services and provide reasonable auxiliary services as requested. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include but are not limited to:
 - a. Provide access to the Work.
 - b. Furnish incidental labor and facilities necessary to facilitate inspections and tests.
 - c. Take adequate quantities of representative samples of materials that require testing or assist the agency in taking samples.
 - d. Provide facilities for storage and curing of test samples.
 - e. Deliver samples to testing laboratories.
 - f. Provide the agency with a preliminary design mix proposed for use for material mixes that require control by the testing agency.
 - g. Provide security and protection of samples and test equipment at the Project Site.

B. Owner Responsibilities: Owner will provide inspections, tests and similar quality control services specified to be performed by independent agencies and not by the Contractor, except where they are specifically indicated as the Contractor's responsibility or are provided by another identified entity. Costs for these services are not included in the Contract Sum.

1. Owner will employ and pay for the services of an independent agency, testing laboratory or other qualified firm to perform services which are the Owner's responsibility.

C. Coordination: Contractor and each agency engaged to perform inspections, tests and similar services shall coordinate the sequence of activities to accommodate required services with a minimum of delay. In addition Contractor and each agency shall coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.

1. Contractor is responsible for scheduling times for inspections, tests, taking samples and similar activities.

1.4 SUBMITTALS

- A. Testing Agency shall submit a certified written report of each inspection, test or similar service, to Engineer/Architect, in duplicate, unless Contractor is responsible for the service. If Contractor is responsible for the service, submit a certified written report of each inspection, test or similar service through the Contractor, in duplicate.
 - 1. Submit additional copies of each written report directly to the governing authority, when the authority so directs.
 - 2. Report Data: Written reports of each inspection, test or similar service shall include, but not be limited to:
 - a. Date of issue.
 - b. Project title and number.
 - c. Name, address and telephone number of testing agency.
 - d. Dates and locations of samples and tests or inspections.
 - e. Names of individuals making the inspection or test.
 - f. Designation of the Work and test method.
 - g. Identification of product and Specification Section.
 - h. Complete inspection or test data.
 - i. Test results and interpretations of test results.
 - j. Comments or professional opinion as to whether inspected or tested Work complies with Contract Document requirements.
 - k. Name and signature of laboratory inspector.
 - l. Recommendations on retesting.

1.5 QUALITY ASSURANCE

- A. Qualification for Testing Agencies: Engage testing agencies, including independent testing laboratories, which are prequalified as complying with "Recommended Requirements for Independent Laboratory Qualification" by the American Council of Independent Laboratories, and which specialize in the types of inspections and tests to be performed.
 - 1. Each independent testing agency engaged on the Project shall be authorized by authorities having jurisdiction to operate in the State in which the Project is located.

PART 2 - PRODUCTS (NOT APPLICABLE).

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

- A. General: Upon completion of inspection, testing, sample-taking and similar services, repair damaged construction and restore substrates and finishes to eliminate deficiencies, including deficiencies in visual qualities of exposed finishes. Comply with Contract Document requirements for "Cutting and Patching."

- B. Protect construction exposed by or for quality control service activities, and protect repaired construction.
- C. Repair and protection is the Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing or similar services.

END OF SECTION 014500

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SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections apply to this Section.

1.2 SUMMARY

- A. This Section includes minimum requirements for construction facilities and temporary controls, including temporary utilities, support facilities, and security and protection. The Contractor retains all responsibility for the adequacy and sufficiency of all jobsite safety precautions and programs.
- B. Temporary utilities required include but are not limited to the following:
 - 1. Water service and distribution.
 - 2. Temporary electric power and light.
 - 3. Temporary heat.
 - 4. Ventilation.
 - 5. Sanitary facilities, including drinking water.
- C. Support facilities include, but are not limited to, the following:
 - 1. Storage sheds.
 - 2. Temporary enclosures.
 - 3. Construction aids and miscellaneous services and facilities.
- D. Security and protection facilities include, but are not limited to, the following:
 - 1. Barricades, warning signs, lights.
 - 2. Temporary protection and support of permanent active utilities within the work area.
 - 3. Temporary protection and support of non-structural items and systems within or near the work area such as, but not limited to entrance ways, doors, electrical rooms, ventilation systems, revenue and access control systems, and lighting systems.

1.3 QUALITY ASSURANCE

- A. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction, including but not limited to, the following:

1. Building Code requirements.
 2. Health and safety regulations.
 3. Utility company regulations.
 4. Police, Fire Department and Rescue Squad rules.
 5. Environmental protection regulations.
- B. Standards: Comply with NFPA Code 241, "Standard for Safeguarding Construction, Alterations, and Demolition Operations," ANSI-A10 Series standards for "Safety Requirements for Construction and Demolition," and NECA Electrical Design Library "Temporary Electrical Facilities."
1. Electrical Service: Comply with NEMA, NECA and UL standards and regulations for temporary electric service. Install service in compliance with NFPA 70, "National Electric Code."
- C. Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

1.4 PROJECT CONDITIONS

- A. General: During the construction period, Contractor shall have full use of premises for construction operations, including use of site. Contractor's use of premises is limited only by Owner's right to have access to grade level parking that would not be affected by the contractors garage repair work. The Owner shall also be allowed access to grade level storage areas (enclosed) within the garage.
- B. The contractor will have full availability of the top and second levels during construction period to allow the work to progress and be completed on or before the date under contract or before inclement weather occurs that prevents some or all of the work to be completed.
- C. Temporary connection to existing utilities: The Contractor may connect into existing utilities within the work area.
1. Confirm the existing utility has sufficient capacity to supply the temporary needs for construction activities. Owner does not guarantee unlimited supply.
 2. Confirm the temporary utility connection does not reduce the utility supply to below the capacity needed by active permanent systems attached to the service. Remove temporary connections found to affect permanent service at no cost to the Owner.
 3. For purposes of bidding, Contractor shall assume that no electrical (water) service is available.
 4. For purposes of bidding, Contractor shall assume following utilities exist:
 - a. Electrical supply: 60 hertz, single phase 120 VAC, service.
 - b. Water supply: potable, 40psi. Note that potable water shall not be provided from fire protection supply systems.

5. All temporary connection installation, maintenance, protection, removal and associated costs shall be responsibility of Contractor and shall not be chargeable to Owner or Engineer/Architect.
6. At each temporary connection provide following:
 - a. Operable utility shutoff device: Device shall be commercially available device such as valve or switch. Shutoff device shall not require removal of a portion of utility line or specialized skill to operate. Device shall be designed to fail in a safe manner and be clearly identified as to its purpose. Location of shutoff device shall be accessible to workers without requiring access to restricted areas.
- D. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in safe and efficient manner. Relocate temporary services and facilities as Work progresses. Do not overload facilities or permit them to interfere with progress. Take necessary fire prevention measures. Do not allow hazardous, dangerous, or unsanitary conditions, or public nuisances to develop or persist on site.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide new materials; if acceptable to Engineer/Architect, undamaged previously used materials in serviceable condition may be used. Provide materials suitable for use intended.
- B. Lumber and Plywood: Comply with requirements in Division 06 Section "Rough Carpentry." All wood used for safety or separation barriers between the public and the work area shall be UL labeled, fire treated.
 1. For job-built temporary offices, shops and sheds within construction area, provide UL labeled, fire treated lumber and plywood for framing, sheathing and siding.
 2. For signs and directory boards, provide exterior type, Grade B-B High Density Concrete Form Overlay Plywood conforming to PS-1, of sizes and thickness indicated.
 3. For fences and vision barriers, provide exterior type, minimum 0.375 in. thick plywood.
 4. For safety barriers, sidewalk bridges and similar uses, provide minimum 0.625 in. thick exterior plywood.
- C. Tarpaulins: Provide waterproof, fire-resistant, UL labeled tarpaulins with flame-spread rating of 15 or less. For temporary enclosures provide translucent nylon reinforced laminated polyethylene or polyvinyl chloride fire retardant tarpaulins.
- D. Water: Provide potable water approved by local health authorities.

2.2 EQUIPMENT

- A. General: Provide new equipment; if acceptable to Engineer/Architect, undamaged, previously used equipment in serviceable condition. Provide equipment suitable for use intended.
- B. Water Hoses: Provide 0.75 in. heavy-duty, abrasion-resistant, flexible rubber hoses 100 ft. long, with pressure rating greater than maximum pressure of water distribution system; provide adjustable shut-off nozzles at hose discharge.
- C. Electrical Outlets: Provide properly configured NEMA polarized outlets to prevent insertion of 110-120 volt plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button and pilot light, for connection of power tools and equipment.
- D. Electrical power cords: provide grounded extension cords; use "hard-service" cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords, if single lengths will not reach areas where construction activities are in progress.
- E. Lamps and Light Fixtures: Provide general service incandescent lamps of wattage required for adequate illumination. Provide guard cages or tempered glass enclosures, where exposed to breakage. Provide exterior fixtures where exposed to moisture.
- F. Heating Units: Provide temporary heating units that have been tested and labeled by UL, FM or another recognized trade association related to the type of fuel being consumed.
- G. Temporary Toilet Units: Provide self-contained single-occupant toilet units of the chemical, aerated recirculation, or combustion type, properly vented and fully enclosed with a glass fiber reinforced polyester shell or similar nonabsorbent material.
- H. First Aid Supplies: Comply with governing regulations.
- I. Fire Extinguishers: Provide hand-carried, portable UL-rated, class "A" fire extinguishers for temporary offices and similar spaces. In other locations provide hand-carried, portable, UL-rated, class "ABC" dry chemical extinguishers, or a combination of extinguishers of NFPA recommended classes for the exposures.
 - 1. Comply with NFPA 10 and 241 for classification, extinguishing agent and size required by location and class of fire exposure.
- J. Temporary Fuel Tanks: Comply with all applicable safety and environmental regulations for temporary surface fuel tanks. Location and installation shall be subject to review and approval of Engineer/Architect and Fire Marshall.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.
- B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed, or are replaced by authorized use of completed permanent facilities.
- C. All temporary facilities shall be located within work area.
- D. Installation of temporary facilities shall not block pedestrian and vehicular traffic to adjacent non-work areas.
- E. Temporary Enclosures: Provide temporary enclosure for protection of construction in progress and completed, from exposure, foul weather, other construction operations and similar activities.
 - 1. Where heat is needed and permanent building enclosure is not complete, provide temporary enclosures where there is no other provision for containment of heat. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.
 - 2. Install tarpaulins securely, with incombustible wood framing and other materials. Close openings of 25 sq ft or less with plywood or similar materials.
 - 3. Close openings through floor or roof decks and horizontal surfaces with load-bearing wood-framed construction.
 - 4. Do not block access to emergency exits from the facility during installation of temporary enclosures unless approved by authorities having jurisdiction.
- F. Collection and Disposal of Waste: Collect waste from construction areas and elsewhere daily. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not hold materials more than 7 days during normal weather or 3 days when temperature is expected to rise above 80° F. (27° C.). Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material in lawful manner.

3.2 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Except for use of permanent fire protection as soon as available, do not change over from use of temporary security and protection facilities to permanent facilities until Substantial Completion, or as directed by Owner.
- B. Temporary Fire Protection: "
 - 1. Locate fire extinguishers where convenient and effective for their intended purpose, but not less than one extinguisher on each floor at or near each usable stairwell.
 - 2. Store combustible materials in containers in fire-safe locations.

3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities, stairways and other access routes for fighting fires. Prohibit smoking in hazardous fire exposure areas.
 4. Provide supervision of welding operations, combustion type temporary heating units, and similar sources of fire ignition.
- C. Barricades, Warning Signs and Lights: Comply with standards and code requirements for erection of structurally adequate barricades. Paint with appropriate colors, graphics and warning signs to inform personnel and public of hazard being protected against. Where appropriate and needed provide lighting, including flashing red or amber lights.
- D. Security Enclosure and Lockup: Install substantial temporary enclosure of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft and similar violations of security.
1. Storage: Where materials and equipment must be stored, and are of value or attractive for theft, provide secure lockup. Enforce discipline in connection with the installation and release of material to minimize opportunity for theft and vandalism.
- E. Environmental Protection: Provide protection, operate temporary facilities and conduct construction in ways and by methods that comply with environmental regulations, and minimize possibility that air, waterways and subsoil might be contaminated or polluted, or that other undesirable effects might result. Avoid use of tools and equipment which produce harmful noise. Restrict use of noise making tools and equipment to hours that will minimize complaints from persons or firms near site.

3.3 OPERATION, TERMINATION AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse.
- B. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.
1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation and similar facilities on 24-hr day basis where required to achieve indicated results and to avoid possibility of damage.
 2. Protection: Prevent water filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.
- C. Termination and Removal: Unless Engineer/Architect requests that it be maintained longer, remove each temporary facility when need has ended, or when replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with the temporary facility. Repair damaged Work, clean exposed surfaces and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.

END OF SECTION 015000

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SECTION 016010 - PRODUCT SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification Sections apply to this Section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling requests for substitutions made after award of Contract.
- B. Contractor's Construction Schedule and Schedule of Submittals are included under Section "Submittal Procedures."
- C. Standards: Refer to Section "Reference Standards and Definitions" for applicability of industry standards to products specified.
- D. Procedural requirements governing Contractor's selection of products and product options are included under Section "Product Requirements."
- E. Engineer/Architect's policy is to reject requests for substitution unless paragraph "Substitutions" under Article "Definitions" applies. Vendors wishing inclusion in Engineer/Architect's master specification: contact Engineer for procedure.

1.3 DEFINITIONS

- A. Definitions used in this Article are not intended to change or modify meaning of other terms used in Contract Documents.
- B. Substitutions: Requests for changes in products, materials, equipment, and methods of construction required by Contract Documents proposed by Contractor after award of Contract are considered requests for "substitutions." Following are not considered substitutions:
 - 1. Revisions to Contract Documents requested by Owner or Engineer/Architect.
 - 2. Specified options of products and construction methods included in Contract Documents.
 - 3. Contractor's determination of and compliance with governing regulations and orders issued by governing authorities.

1.4 SUBMITTALS

- A. Substitution Request Submittal: Requests for substitution will be considered if received within 15 days after commencement of Work. Requests received more than 15 days after commencement of Work may be considered or rejected at discretion of Engineer/Architect.
1. Submit 3 copies of each request for substitution for consideration. Submit requests on forms included at end of this Section and in accordance with procedures required for Change Order proposals.
 2. Identify product, or fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers. Provide complete documentation showing compliance with requirements for substitutions, and the following information, as appropriate:
 - a. Product Data, including Drawings and descriptions of products, fabrication and installation procedures.
 - b. Samples, where applicable or requested.
 - c. Detailed comparison of significant qualities of proposed substitution with those of Work specified. Significant qualities may include elements such as size, weight, durability, performance and visual effect.
 - d. Coordination information, including list of changes or modifications needed to other parts of Work and to construction performed by Owner and separate Contractors, that will become necessary to accommodate proposed substitution.
 - e. Statement indicating substitution's effect on Contractor's Construction Schedule compared to schedule without approval of substitution. Indicate effect of proposed substitution on overall Contract Time.
 - f. Cost information, including proposal of net change, if any in Contract Sum.
 - g. Certification by Contractor that substitution proposed is equal-to or better in every significant respect to that required by Contract Documents, and that it will perform adequately in application indicated. Include Contractor's waiver of rights to additional payment or time, that may subsequently become necessary because of failure of substitution to perform adequately.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

- A. Conditions: Contractor's substitution request will be received and considered by Engineer/Architect when one or more of following conditions are satisfied, as determined by Engineer/Architect; otherwise requests will be returned without action except to record noncompliance with these requirements.
1. Extensive revisions to Contract Documents are not required.
 2. Proposed changes are in keeping with general intent of Contract Documents.
 3. Request is timely, fully documented and properly submitted.
 4. Request is directly related to an "or equal" clause or similar language in Contract Documents.

5. Specified product or method of construction cannot be provided within Contract Time. Request will not be considered if product or method cannot be provided as result of failure to pursue Work promptly or coordinate activities properly.
 6. Specified product or method of construction cannot receive necessary approval by governing authority, and requested substitution can be approved.
 7. Substantial advantage is offered the Owner, in terms of cost, time, energy conservation or other considerations of merit, after deducting offsetting responsibilities Owner may be required to bear. Additional responsibilities for Owner may include additional compensation to Engineer/Architect for redesign and evaluation services, increased cost of other construction by Owner or separate Contractors, and similar considerations.
 8. Specified product or method of construction cannot be provided in manner that is compatible with other materials, and where Contractor certifies that substitution will overcome incompatibility.
 9. Specified product or method of construction cannot be coordinated with other materials, and where Contractor certifies that proposed substitution can be coordinated.
 10. Specified product or method of construction cannot provide warranty required by Contract Documents and where Contractor certifies that proposed substitution provide required warranty.
- B. Contractor's submittal and Engineer/Architect's acceptance of Shop Drawings, Product Data or Samples that relate to construction activities not complying with Contract Documents does not constitute an acceptable or valid request for substitution, nor does it constitute approval.

PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION 016010

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REQUEST FOR SUBSTITUTION

To:

Attention:

From:

Name of Company

Address

City, State, Zip Code

Phone

Fully answer all information requested below. Failure to answer any item may cause rejection of request for substitution. If requested by Engineer/Architect, submit information about manufacturer and vendor history, financial stability, distribution and support systems. Use one form for each product requested. Only first product listed will be considered on forms with more than one product listed.

Specification Section Number: _____ Drawing Number: _____

Para Number: _____ Detail Number: _____

Specified Product: _____

Proposed Substitution: _____

Answer the following questions. Attach an explanation sheet on your company's letterhead when required.

Does the proposed substitution affect dimensions indicated on Drawings?

No _____ Yes _____ (If yes, explain below).

Does the proposed substitution require changes in Drawings and/or design or installation changes?

No _____ Yes _____

If yes, is the cost of these changes included in the proposed amount? No _____ Yes _____

Does the proposed substitution affect other trades? No _____ Yes _____

(If yes, explain who and how)

If the proposed product does affect the work of other trades, has the cost impact on their work been included in the price of the proposed substitution?

No _____ Yes _____

Does the proposed product's guarantee differ from that of the specified product's?

No _____ Yes _____ (If yes, explain below).

Why is this proposal for substitution being submitted? List reasons below.

Attach a listing of 3 projects using proposed substitution completed within the past 5 yrs in geographic and climatic region of Project. One of applications shall have been in service for at least 3 yrs.

Attach product data/brochures and Vendor Qualification Form for the specified and substitute product.

Undersigned has examined Construction Documents, is familiar with specified product, understands indicated application of product, and understands design intent of Engineer/Architect. Undersigned states that proposed substitution complies with Construction Documents and will perform at least equally to specified product within limitations stated above. Undersigned accepts responsibility for coordinating application and installation of proposed substitution and waives all claims for additional costs resulting from incorporation of proposed substitution into Project or its subsequent failure to perform according to specified requirements.

Submitted By: _____
Typed Signature

Date: _____

**Vendor Qualification Form
Walker Parking Consultants/Engineers, Inc.**

1. Statement of Confidentiality:

Walker Parking Consultants/Engineers, Inc. (WPC) will treat any information as confidential which is clearly labeled so. A "clear label" is defined as the word "Confidential" marked in red ink on each and every page desired confidential in letters no less than one half inch high. At most, only two WPC staff will have access to vendor information marked "Confidential", Randy Carwile and his designate.

2. Statement of WPC's Commitment to Quality:

WPC is committed to providing quality service to its clients. As part of this commitment, WPC never makes a promise it cannot keep. WPC requires the same commitment from its vendors, whether direct or indirect.

3. Statement of WPC's Relationship to its Vendors:

Mutual trust is the relationship WPC desires with all its vendors. Both WPC and its vendors must realize that trust must be earned over time. Trust is easily damaged and sometimes impossible to recover.

4. Vendor's Organization:

For the product being considered, list the number of employees in:

_____	Product manufacture
_____	Product sales
_____	Product marketing
_____	Product R & D
_____	Product technical service
=====	TOTAL

5. Financial Stability:

Provide past 5 yrs sales history and current audited financial statement or equivalent documentation of financial stability.

6. Safety and Environment:

Define vendor policies.

7. Sales/Service Offices:

List all locations.

8. Geographic Markets:

List all areas served.

9. Products:

On (a) separate sheet(s) for each product, list product name, uses, length of time in service, test data. Provide Material Safety Data Sheet(s). Provide case history data of product use in 5 major projects within the last 2 yrs.

10. Quality Assurance:

Define manufacturing program. Define installation program.

11. Installation:

By manufacturer?	_____ Y	_____ N
By certified applicators?	_____ Y	_____ N
By approved applicators?	_____ Y	_____ N
By any applicator?	_____ Y	_____ N

12. Comments:

13. Standard Warranty:

Provide copy of terms.

14. References:

Provide three.

Signature: _____

Printed name: _____

Title: _____

Date: _____

Have this statement notarized.

Decision of Engineer/Architect regarding acceptance or rejection of proposed substitution will be based, at least in part, on information supplied above and in attached explanations and product data.

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SECTION 017300 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Construction layout.
 - 2. Field engineering.
 - 3. General installation of products.
 - 4. Progress cleaning.
 - 5. Protection of installed construction.
 - 6. Correction of the Work.
 - 7. Construction Phasing.
 - 8. Maintaining public access through or adjacent to the Work.
- B. Related Sections include the following:
 - 1. Division 01 Section "Project Management and Coordination" for procedures for coordinating field engineering with other construction activities.
 - 2. Division 01 Section "Submittal Procedures" for submitting surveys.
 - 3. Division 01 Section "Cutting and Patching" for procedural requirements for cutting and patching necessary for the installation or performance of other components of the Work.
 - 4. Division 01 Section "Closeout Procedures" for submitting final Project Record Documents,
 - 5. Division 02 Section "Work Items" for coordinating restoration construction activities to maintain Owner's operations during construction.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.
 - 1. Before construction, verify the location and points of connection of utility services.
- B. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
 - 1. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
 - a. Description of the Work.
 - b. List of detrimental conditions, including substrates.
 - c. List of unacceptable installation tolerances.
 - d. Recommended corrections.
 - 2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 - 3. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 - 4. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- C. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Engineer. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

3.3 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- F. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Engineer.
 2. Allow for building movement, including thermal expansion and contraction.
- G. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- H. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.4 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F (27 deg C).
 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
- B. Site: Maintain Project site free of waste materials and debris.

- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 - 1. Remove liquid spills promptly.
 - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Exposed Surfaces: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- F. Cutting and Patching: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.
 - 1. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition.
- G. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.6 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 01 Section "Cutting and Patching."
 - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 017300

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SECTION 017329 - CUTTING AND PATCHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes procedural requirements for cutting and patching.
- B. Related Sections include the following:
 - 1.
 - 2. Divisions 02 through 14, 21-26, for specific requirements and limitations applicable to cutting and patching individual parts of the Work.
 - a. Requirements in this Section apply to mechanical and electrical installations. Refer to Divisions 22 and 26 Sections for other requirements and limitations applicable to cutting and patching mechanical and electrical installations.

1.3 DEFINITIONS

- A. Cutting: Removal of existing construction necessary to permit installation or performance of other Work.
- B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

1.4 SUBMITTALS

- A. Cutting and Patching Proposal: Submit a proposal describing procedures at least 10 days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:
 - 1. Extent: Describe cutting and patching, show how they will be performed, and indicate why they cannot be avoided.
 - 2. Changes to Existing Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.
 - 3. Products: List products to be used and firms or entities that will perform the Work.

4. Dates: Indicate when cutting and patching will be performed.
5. Utilities: List utilities that cutting and patching procedures will disturb or affect. List utilities that will be relocated and those that will be temporarily out of service. Indicate how long service will be disrupted.
6. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.
7. Engineer's Approval: Obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.

1.5 QUALITY ASSURANCE

- A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.

1.6 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections of these Specifications.
- B. Existing Materials: Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of existing materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
 1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Existing Services: Where existing services are required to be removed, relocated, or abandoned, bypass such services before cutting to avoid interruption of services to occupied areas.

3.3 PERFORMANCE

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 1. Cut existing construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Cutting: Cut existing construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 2. Existing Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 3. Proceed with patching after construction operations requiring cutting are complete.
- C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.
 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.

2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
3. Ceilings: Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.
4. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weather tight condition.

END OF SECTION 017329

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SECTION 017423 - FINAL CLEANING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification Sections apply to this Section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for final cleaning at Substantial Completion.
 - 1. Special cleaning requirements for specific elements of Work are included in appropriate Sections of Divisions 02 through 14, 21-26.
- B. General Project closeout requirements are included in Section "Closeout Procedures."
- C. General cleanup and waste removal requirements are included in Section "Temporary Facilities and Controls."
- D. Environmental Requirements: Conduct cleaning and waste disposal operations in compliance with local laws and ordinances. Comply fully with federal and local environmental and anti-pollution regulations.
 - 1. Do not dispose of volatile wastes such as mineral spirits, oil or paint thinner in storm or sanitary drains.
 - 2. Burning or burying of debris, rubbish or other waste material on the premises will not be permitted.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by the manufacturer or fabricator of surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property, or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General: Provide final cleaning operations when indicated. Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit of Work to the condition expected from commercial building cleaning and maintenance program. Comply with manufacturer's instructions.
- B. Complete following cleaning operations before requesting inspection for Certification of Substantial Completion for entire Project or a portion of Project.
 - 1. Clean Project site, yard and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste materials, litter and foreign substances. Sweep paved areas broom clean. Remove petro-chemical spills, stains and other foreign deposits. Rake grounds that are neither planted nor paved, to a smooth even-textured surface.
 - 2. Remove tools, construction equipment, machinery and surplus material from the site.
 - 3. Remove snow and ice to provide safe access to the building.
 - 4. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - 5. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics and similar spaces.
 - 6. Broom clean concrete floors in unoccupied spaces.
 - 7. Vacuum clean carpet and similar soft surfaces, removing debris and excess nap. Shampoo if required.
 - 8. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - 9. Touch-up and otherwise repair and restore marred exposed finishes and surfaces. Replace finishes and surfaces that can not be satisfactorily repaired or restored, or that show evidence of repair or restoration. Do not paint over "UL" and similar labels, including mechanical and electrical name plates.
 - 10. Wipe surfaces of mechanical and electrical equipment, elevator equipment and similar equipment. Remove excess lubrication, paint and mortar droppings and other foreign substances.
 - 11. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - 12. Replace air disposable filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills. Clean ducts, blowers, and coils if units were operated without filters during construction.
 - 13. Clean food service equipment to a sanitary condition, ready and acceptable for its intended use.
 - 14. Clean light fixtures, lamps, globes and reflectors to function with full efficiency. Replace burned out bulbs, and defective and noisy starters in fluorescent and mercury vapor fixtures.
 - 15. Leave Project clean and ready for occupancy.

- C. Pest Control: Engage an experienced licensed exterminator to make final inspection, and rid Project of rodents, insects, and other pests. Comply with regulations of local authorities.
- D. Removal of Protection: Remove temporary protection and facilities installed during construction to protect previously completed installations during remainder of construction period.
- E. Compliances: Comply with governing regulations and safety standards for cleaning operations. Remove waste materials from the site and dispose of in a lawful manner.
 - 1. Where extra materials of value remain after completion of associated construction have become Owner's property, dispose of these materials as directed.

END OF SECTION 017423

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SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification Sections apply to this Section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for project closeout, including but not limited to:
 - 1. Inspection procedures.
 - 2. Submittal of warranties.
 - 3. Final cleaning.
- B. Closeout requirements for specific construction activities are included in appropriate Sections in Divisions 02 through 14, 21-26.

1.3 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for certification of Substantial Completion, complete following. List exceptions in request.
 - 1. In Application for Payment that coincides with, or first follows, date Substantial Completion is claimed, show 100% completion for portion of Work claimed as substantially complete. Include supporting documentation for completion as indicated in these Contract Documents and statement showing an accounting of changes to Contract Sum.
 - a. If 100% completion cannot be shown, include list of incomplete items, value of incomplete construction, and reasons Work is not complete.
 - 2. Advise Owner of pending insurance change-over requirements.
 - 3. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications and similar documents.
 - 4. Obtain and submit releases enabling Owner unrestricted use of Work and access to services and utilities; include occupancy permits, operating certificates and similar releases.
 - 5. Submit record drawings, maintenance manuals, final project photographs, damage or settlement survey, property survey, and similar final record information.
 - 6. Deliver tools, spare parts, extra stock, and similar items.

7. Make final change-over of permanent locks and transmit keys to Owner. Advise Owner's personnel of change-over in security provisions.
 8. Complete start-up testing of systems, and instruction of Owner's operating and maintenance personnel. Discontinue or change over and remove temporary facilities from site, along with construction tools, mock-ups, and similar elements.
 9. Complete final clean up requirements, including touch-up painting. Touch-up and otherwise repair and restore marred exposed finishes.
- B. Inspection Procedures: On receipt of request for inspection, Engineer/Architect will either proceed with inspection or advise Contractor of unfilled requirements. Engineer/Architect will prepare Certificate of Substantial Completion following inspection, or advise Contractor of construction that must be completed or corrected before certificate will be issued.
1. Engineer/Architect will repeat inspection when requested and assured that Work has been substantially completed.
 2. Engineer/Architect will provide one repeat inspection under its contract with Owner. Subsequent inspections shall be at Contractor's expense.
 3. Results of completed inspection will form basis of requirements for final acceptance.

1.4 FINAL ACCEPTANCE

- A. Preliminary Procedures: Before requesting final inspection for certification of final acceptance and final payment, complete the following. List exceptions in request.
1. Submit final payment request with releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.
 2. Submit an updated final statement, accounting for final additional changes to Contract Sum.
 3. Submit certified copy of Engineer/Architect's final inspection list of items to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance and list has been endorsed and dated by Engineer/Architect.
 4. Submit consent of surety to final payment.
 5. Submit final liquidated damages settlement statement.
 6. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
- B. Reinspection Procedure: Engineer/Architect will reinspect Work upon receipt of notice that Work, including inspection list items from earlier inspections, has been completed, except items whose completion has been delayed because of circumstances acceptable to Engineer/Architect.
1. Engineer/Architect will provide one repeat inspection under its contract with Owner. Subsequent inspections shall be at Contractor's expense.

2. Upon completion of reinspection, Engineer/Architect will prepare certificate of final acceptance, or advise Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.
3. If necessary, reinspection will be repeated.

PART 2 - PRODUCTS (NOT APPLICABLE).

PART 3 - EXECUTION

3.1 CLOSEOUT PROCEDURES

- A. Operating and Maintenance Instructions: Arrange for each installer of equipment that requires regular maintenance to meet with Owner's personnel to provide instruction in proper operation and maintenance. If installers are not experienced in procedures, provide instruction by manufacturer's representatives. Include detailed review of following items:
 1. Maintenance manuals.
 2. Record documents, including all final surveys.
 3. Warranties and bonds.
 4. Maintenance agreements and similar continuing commitments.

END OF SECTION 017700

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SECTION 017836 - WARRANTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for warranties required by Contract Documents, including manufacturers standard warranties on products and special warranties.
 - 1. Refer to General Conditions for terms of Contractor's period for correction of Work.
- B. Related Sections: Following Sections contain requirements that relate to this Section:
 - 1. Division 01 Section "Submittal Procedures" specifies procedures for submitting warranties.
 - 2. Division 01 Section "Closeout Procedures" specifies contract closeout procedures.
 - 3. Divisions 02 through 14, 21-26 for specific requirements for warranties on products and installations specified to be warranted.
 - 4. Certifications and other commitments and agreements for continuing services to Owner are specified elsewhere in Contract Documents.
- C. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of warranty on Work that incorporates products. Manufacturer's disclaimers and limitations on product warranties do not relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

1.3 DEFINITIONS

- A. Standard Product Warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by manufacturer to Owner.
- B. Special warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

1.4 WARRANTY REQUIREMENTS

- A. Related Damages and Losses: When correcting failed or damaged warranted construction, remove and replace construction that has been damaged as result of such failure or must be removed and replaced to provide access for correction of warranted construction.
- B. Reinstatement of Warranty: When Work covered by warranty has failed and been corrected by replacement or rebuilding, reinstate warranty by written endorsement. Reinstated warranty shall be equal to original warranty with equitable adjustment for depreciation.
- C. Replacement Cost: Upon determination that Work covered by warranty has failed replace or rebuild Work to an acceptable condition complying with requirements of Contract Documents. Contractor is responsible for cost of replacing or rebuilding defective Work regardless of whether Owner has benefited from use of Work through portion of its anticipated useful service life.
- D. Owner's Recourse: Expressed warranties made to Owner are in addition to implied warranties, and shall not limit duties, obligations, rights and remedies otherwise available under law. Expressed warranty periods shall not be interpreted as limitations on the time in which the Owner can enforce such other duties, obligations, rights, or remedies.
 - 1. Rejection of Warranties: Owner reserves right to reject warranties and to limit selection to products with warranties not in conflict with requirements of Contract Documents.
- E. Where Contract Documents require a special warranty, or similar commitment on Work or part of Work, Owner reserves the right to refuse to accept Work, until Contractor presents evidence that entities required to countersign such commitments are willing to do so.

1.5 SUBMITTALS

- A. Submit written warranties to Engineer/Architect prior to date certified for Substantial Completion. If Engineer/Architect's Certificate of Substantial Completion designates commencement date for warranties other than date of Substantial Completion for Work, or designated portion of Work, submit written warranties upon request of Engineer/Architect.
- B. When designated portion of Work is completed and occupied or used by Owner, by separate agreement with Contractor during construction period, submit properly executed warranties to Engineer/Architect within 15 days of completion of that designated portion of Work.
 - 1. When Contract Documents require Contractor, or Contractor and subcontractor, supplier or manufacturer to execute a special warranty, prepare written document

that contains appropriate terms and identification, ready for execution by required parties. Submit draft to Owner through Engineer/Architect for approval prior to final execution.

- C. Forms for special warranties are included at end of this Section. Prepare written document utilizing appropriate form, ready for execution by Contractor, or by Contractor and subcontractor, supplier or manufacturer. Submit draft to Owner through Engineer/Architect for approval prior to final execution.
 - 1. Refer to Divisions 02 through 14, 21-27, and 31-33 Sections for specific content requirements and particular requirements for submittal of special warranties
- D. Form of Submittal: At Final Completion compile 2 copies of each required warranty properly executed by Contractor, or by Contractor, subcontractor, supplier, or manufacturer. Organize warranty documents into an orderly sequence based on table of contents of Project Manual.
- E. Bind warranties and bonds in heavy-duty, commercial quality, durable 3-ring vinyl covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8.5 in. by 11in. paper.
 - 1. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark tab to identify product or installation. Provide typed description of product or installation, including name of product, and name, address, and telephone number of Installer.
 - 2. Identify each binder on front and spine with typed or printed title "WARRANTIES," Project title or name, and name of Contractor.
 - 3. When warranted construction requires operation and maintenance manuals, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION 017836

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SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for Project Record Documents, including the following:
 - 1. Record Drawings.
 - 2. Record Specifications.
 - 3. Record Product Data.
- B. Related Sections include the following:
 - 1. Division 01 Section "Closeout Procedures" for general closeout procedures and maintenance manual requirements.
 - 2. Divisions 02 through 14, 21-26 for specific requirements for Project Record Documents of products in those Sections.

1.3 SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit one set of marked-up Record Prints.
 - 2. Number of Copies: Submit copies of Record Drawings as follows:
 - a. Initial Submittal: Submit **one** set of marked-up Record Prints. Engineer/Architect will initial and date each plot and mark whether general scope of changes, additional information recorded, and quality of drafting are acceptable. Engineer/Architect will return the prints for organizing into sets, printing, binding, and final submittal.
 - b. Final Submittal: Submit **[one]** set of marked-up Record Prints, of record copies. Print each Drawing, whether or not changes and additional information were recorded.
 - 1) Electronic Media: [3-1/2-inch diskettes, formatted for 1.44 MB] [CD-ROM].

- B. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications.
- C. Record Product Data: Submit one copy of each Product Data submittal.
 - 1. Where Record Product Data is required as part of operation and maintenance manuals, submit marked-up Product Data as an insert in the manual instead of submittal as Record Product Data.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

- A. Record Prints: Maintain one set of blue- or black-line white prints of the Contract Drawings and Shop Drawings.
 - 1. Preparation: Mark Record Prints to show the actual installation and unit quantity where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Accurately record information in an understandable drawing technique.
 - c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
 - 2. Content: Types of items requiring marking include, but are not limited to, the following:
 - a. Dimensional changes to Drawings.
 - b. Revisions to details shown on Drawings.
 - c. Depths of foundations below first floor.
 - d. Locations and depths of underground utilities.
 - e. Revisions to routing of piping and conduits.
 - f. Revisions to electrical circuitry.
 - g. Actual equipment locations.
 - h. Duct size and routing.
 - i. Locations of concealed internal utilities.
 - j. Changes made by Change Order or Construction Change Directive.
 - k. Changes made following Engineer/Architect's written orders.
 - l. Details not on the original Contract Drawings.
 - m. Field records for variable and concealed conditions.
 - n. Record information on the Work that is shown only schematically.
 - o. Actual location and quantity of unit price items of the Work.

3. Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.
 4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.
 5. Mark important additional information that was either shown schematically or omitted from original Drawings.
 6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Record Transparencies: Immediately before inspection for Certificate of Substantial Completion, review marked-up Record Prints with Engineer/Architect. When authorized, prepare a full set of corrected transparencies of the Contract Drawings and Shop Drawings.
1. Incorporate changes and additional information previously marked on Record Prints. Erase, redraw, and add details and notations where applicable.
 2. Refer instances of uncertainty to Engineer/Architect for resolution.
 3. Owner will furnish Contractor one set of transparencies of the Contract Drawings for use in recording information.
 4. Print the Contract Drawings and Shop Drawings for use as Record Transparencies. Engineer/Architect will make the Contract Drawings available to Contractor's print shop.
- C. Newly Prepared Record Drawings: Prepare new Drawings instead of preparing Record Drawings where Engineer/Architect determines that neither the original Contract Drawings nor Shop Drawings are suitable to show actual installation.
1. New Drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.
 2. Consult with Engineer/Architect for proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. Integrate newly prepared Record Drawings into Record Drawing sets; comply with procedures for formatting, organizing, copying, binding, and submitting.
- D. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Record Prints: Organize Record Prints and newly prepared Record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
 2. Record Transparencies: Organize into unbound sets matching Record Prints. Place transparencies in durable tube-type drawing containers with end caps. Mark end cap of each container with identification. If container does not include a complete set, identify Drawings included.
 3. Record CAD Drawings: Organize CAD information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each CAD file.

4. Identification: As follows:
 - a. Project name.
 - b. Date.
 - c. Designation "PROJECT RECORD DRAWINGS."
 - d. Name of Engineer/Architect.
 - e. Name of Contractor.

2.2 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 3. Record the name of the manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
 4. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.
 5. Note related Change Orders, Record Drawings, where applicable.

2.3 RECORD PRODUCT DATA

- A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
 3. Note related Change Orders, Record Drawings, where applicable.

2.4 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.
- B. Maintenance of Record Documents and Samples: Store Record Documents and Samples in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Engineer/Architect's reference during normal working hours.

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SECTION 020010 - WORK ITEMS

PART 1 - GENERAL

RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Divisions 1, 2, 3, 5, 7 and 9 Specification Sections apply to this Section.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

WI 1.0 GENERAL REQUIREMENTS

- A. Scope of Work
 - 1. Work consists of performing all tasks, specifically required and incidental, which are not identified under separate Work Item designation, but necessary to perform the work identified in this project. This work includes, but is not limited to the following items:
 - WI 1.1 - Mobilization
 - WI 1.2 - Concrete Formwork
 - WI 1.3 - Concrete Shores and Reshores
 - WI 1.4 - Concrete Reinforcement
 - WI 1.5 - Temporary Signage

WI 1.1 PROJECT MOBILIZATION

- A. Scope of Work
 - 1. Work consists of coordinating, scheduling, obtaining and assembling at construction site all equipment, materials, permits, supplies, manpower and other essentials and incidentals necessary to perform Work defined in this Contract. Payment of lump sum amount for mobilization shall be according to following schedule and shall be based on percentage of original contract amount earned.
- B. Materials
 - 1. None
- C. Execution

1. At execution of agreement by all parties, payment of not more than 25% of mobilization lump sum amount.
2. When amount earned is greater than 10% but less than 25% of original contract amount, an additional amount will be paid to bring total payment for mobilization to 50% of mobilization lump sum amount.
3. When amount earned is equal to or greater than 25% but less than 50% of original contract amount, an additional amount will be paid to bring total payment for mobilization to 75% of mobilization lump sum amount.
4. When amount earned is equal to or greater than 50% of original contract amount, an additional amount will be paid to bring total payment for mobilization to 100% of mobilization lump sum amount.

WI 1.2 CONCRETE FORMWORK

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, supervision, and incidentals necessary to install shoring and formwork as required for cast-in-place concrete.

B. Materials

1. Forms for Exposed Finish Concrete: Plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on Drawings.
 - a. Use overlaid plywood complying with U.S. Product Standard PS-1 "A-C or B-B High Density Overlaid Concrete Form," Class I
 - b. Use plywood complying with U.S. Product Standard PS-1 "B-B (Concrete Form) Plywood," Class I, Exterior Grade or better, mill-oiled and edge-sealed, with each piece bearing legible inspection trademark.
2. Forms for Unexposed Finish Concrete: Plywood, lumber, metal, or other acceptable material. Provide lumber dressed on at least 2 edges and one side for tight fit.
3. Form Coatings: Provide commercial formulation form-coating compounds with a maximum VOC of 350 mg/l that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces, including but not limited to water-curing, curing compound, stains, or paints.
4. Form Ties: Factory-fabricated, adjustable-length, removable or snap-off metal form ties, designed to prevent form deflection and to prevent spalling concrete upon removal. Provide units that will leave no metal closer than 1.5 in. to exposed surface.
 - a. Provide ties that, when removed, will leave holes not larger than 1.0 in. diameter in concrete surface.

5. Shores:

- a. Nail Ellis clamps, if used with wood shores, to shores with minimum of two nails to prevent slipping.
- b. Wedges: Hardwood or steel. Softwood wedges prohibited.

C. Execution

1. Work shall conform to requirements of ACI 301 "Standard Specifications for Structural Concrete," ACI 302.1 R "Guide for Concrete Floor Slab Construction," ACI 318 "Building Code Requirements for Reinforced Concrete," and ACI 347 "Recommended Practice for Concrete Formwork" except as modified by the following paragraphs.
2. Store all formwork and formwork materials clear of ground, protected, so as to preclude damage.
3. Construct forms to sizes, shapes, lines, and dimensions shown and to obtain accurate alignment, location, grades, level, and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in work. Use selected materials to obtain required finishes. Solidly butt joints and provide backup at joints to prevent leakage of cement paste.
4. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like, for easy removal.
5. Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for placement of concrete. Securely brace temporary openings and set tightly to forms to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
6. Chamfer exposed corners and edges as indicated, using wood, metal, PVC, or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.
7. Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in finished slab surface. Provide and secure units sufficiently strong to support types of screed strips by use of strike-off templates or accepted compacting type screeds
8. Coat contact surfaces of forms with accepted, nonresidual, low-VOC form-coating compound before reinforcement is placed.
9. Coat steel forms with non-staining, rust-preventive form oil or otherwise protect against rusting. Rust-stained steel formwork not acceptable.
10. For non-post-tensioned concrete, formwork shall remain in place until concrete has reached minimum two-thirds of 28-day strength. Do not place additional loads on structure until concrete has been properly reshored.
11. Clean and repair surfaces of forms to be re-used in Work. Split, frayed, delaminated or otherwise damaged form facing material will not be acceptable for exposed surfaces. Apply new form coating compound as specified for new formwork.

12. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use "patched" forms for exposed concrete surfaces, except as acceptable to Engineer/Architect.

WI 1.3 CONCRETE SHORES AND RESHORES

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, supervision, and incidentals necessary to install temporary shoring as needed to facilitate repairs where required and to maintain shores in place until restoration Work requiring shores and associated concrete has properly cured.

B. Materials

1. Shores shall be steel, rated at a minimum allowable load of 4,500 lb at 12 ft extension or steel shoring towers rated at a minimum allowable load of 40,000 lbs per four leg tower (based on two 20,000 lb crossed braced frames.).

C. Execution

1. Comply with ACI 301 and ACI 347 for shoring and reshoring in multi-story construction, except as modified in this Section.
2. For purpose of calculations: Construction Load = 50 psf; Dead Load = 75 psf for the floor slab plus the dead load of beams and girders..
3. Shore/Reshore loads on the structure shall not exceed 40 psf distributed load on the slab, and concentrated loads shall not exceed posted wheel loads or 2,000 lbs., whichever is less. Concentrated bearing pressures shall not exceed 1,200 psi.
4. Shore/Reshore loads on concrete slab-on-grade shall be distributed by steel grillage or timber grillage so as not to exceed soil bearing capacity or 1,500 psf, whichever is smaller.
5. Shore/Reshore loads on asphalt slab-on-grade shall be distributed by steel grillage so as not to exceed asphalt/soil bearing capacity, with consideration of reduced asphalt bearing capacity during extreme hot weather.
6. Shore/Reshore loads shall be distributed horizontally and/or distributed to more than one level to meet shore/reshore load limitations.
7. Shore/Reshore loads shall be distributed to multiple framing members (beams/joists/double tee stems) and extend beyond the immediate work area to ensure proper distribution of loads throughout the structure.
8. Prior to installation of shores, Contractor shall submit shoring scheme prepared and sealed by registered Professional Engineer in Maine.
9. Engineer/Architect will review shoring scheme for general conformance to requirements stated herein. If it does not conform, Contractor will be informed to resubmit another shoring scheme.
10. Remove shores and reshore in planned sequence to avoid damage to partially cured concrete. Locate and provide adequate reshoring to safely support Work without excessive stress or deflection.

11. Keep reshores in place as required until heavy loads due to construction operations have been removed.
12. If during construction, modifications are necessary to accommodate other trades, revise and resubmit erection plan to Engineer/Architect for review.

WI 1.4 CONCRETE REINFORCEMENT

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, supervision, and incidentals necessary to fabricate and install all mild steel reinforcement and epoxy coated reinforcement where required at repair sites to supplement or replace corroded or damaged reinforcement as determined by the Engineer.

B. Materials

1. Reinforcement materials shall be as specified in ACI 301 "Standard Specifications for Structural Concrete."
2. Welded wire reinforcement: provide mats only. Roll stock prohibited.
3. Epoxy Coating Materials for Reinforcement: ASTM A775 and A884:
4. Provide one of following epoxy coatings for reinforcement and steel accessories as noted on the Drawings:
 - a. "Scotchkote 413," by 3M Company, St. Paul, MN.
 - b. "Nap-Gard 7-2719," by DuPont Powder Coatings, USA, Inc.
5. Use patching material recommended by epoxy powder manufacturer, compatible with epoxy coating and inert in concrete. Acceptable materials are as follows:
 - a. "Scotchkote 413/215," by 3M Company, St. Paul, MN.
 - b. "MasterEmaco P124," by BASF Building Systems, Shakopee, MN.
 - c. "Duralprep AC," by The Euclid Chemical Company, Cleveland, OH.
 - d. "Sika Armatec 110 EpoCem," by Sika Corporation, Lyndhurst NJ.
6. Corrosion Inhibiting Coating for Existing Exposed Non-prestressed Steel Reinforcement or Welded wire reinforcement:
 - a. "MasterEmaco ADH 326," by BASF Building Systems, Shakopee, MN.
 - b. "Euco 452", or "Duralcrete Series" by The Euclid Chemical Company, Cleveland, OH.
 - c. "Sikadur 32 Hi-Mod LPL," by Sika Corporation, Lyndhurst, NJ.
 - d. "Sika Armatec 110 EpoCem," by Sika Corporation, Lyndhurst NJ.

C. Execution

1. Work shall conform to requirements of ACI 301 "Standard Specifications for Structural Concrete," ACI 315-80 "Details and Detailing of Concrete Reinforcement," ACI 318 "Building Code Requirements for Reinforced Concrete," and Concrete Reinforcing Steel Institute (CRSI), "Manual of Standard Practice."

2. Submittals required include: Product data for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, waterstops, joint systems, curing compounds, and others as requested by Engineer/Architect including, but not limited to:
 - a. Manufacturer's product data and installation instructions for proprietary form coatings, manufactured form systems, ties, and accessories.
 - b. Steel producer's certificates of mill analysis, tensile tests, and bend tests.
 - c. Manufacturer's product data, specifications, and installation instructions for proprietary materials, welded and mechanical splices, and reinforcement accessories.
 - d. Corrosion Inhibitor for Reinforcement:
 - 1) Written certification from coating manufacturer that coating resin for reinforcement has been approved by National Bureau of Standards.
 - 2) Written information from coating manufacturer on proper use and application of coating resin.
 - e. Submit all materials and methods for concrete curing to Engineer/Architect for approval before beginning concreting Work. Include certification of curing compound allowable moisture loss.
3. Store concrete reinforcement materials at site to prevent damage and accumulation of dirt or excessive rust.
4. Epoxy Coated Reinforcement:
 - a. Contact areas of handling and hoisting systems shall be padded or be made of nylon or other acceptable material.
 - b. Use spreader bars to lift bundles of coated steel to prevent bar-to-bar abrasion.
 - c. Pad bundling bands or fabricate of nylon or other acceptable material.
 - d. Store coated steel on padded or wooden cribbing.
 - e. Do not drag coated steel members.
 - f. After placement, restrict traffic on coated steel to prevent damage.
5. Reinforcement with any of following defects will be rejected:
 - a. Lengths, depths and bends exceeding CRSI fabrication tolerances.
 - b. Bends or kinks not indicated on Drawings or final Shop Drawings.
 - c. Reduced cross-section due to excessive rusting or other cause.
6. General: Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars," for details and methods of reinforcement placement and supports and as herein specified.
 - a. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials that reduce or destroy bond with concrete.
 - b. Fabricate reinforcement to conform to required shapes and dimensions, with fabrication tolerances complying with CRSI MSP. In case of fabricating errors, do not re-bend or straighten reinforcement in manner that will injure or weaken material.

- c. Bends in reinforcement are standard 90° bends unless noted otherwise.
- d. Reinforcement with any of following defects will be rejected:
 - 1) Lengths, depths and bends exceeding CRSI fabrication tolerances.
 - 2) Bends or kinks not indicated on Drawings or final Shop Drawings.
 - 3) Reduced cross-section due to excessive rusting or other cause.
- e. Epoxy coated reinforcement: Fabricator and applicator to provide installer with written instructions to handle, store and place epoxy coated reinforcement to prevent damage to coating.
- f. Comply with ACI 301, Chapter 3 for placing reinforcement.
- g. Use rebar chairs and accessories to hold all reinforcing positively in place. Provide rebar chairs at all formed surfaces, both vertical and horizontal, to maintain minimum specified cover. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces. Maximum spacing of chairs and accessories shall be per CRSI Manual of Standard Practice. In situations not covered by CRSI, provide support at 4 ft on center maximum each way.
- h. Install welded wire reinforcement in as long lengths as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.
- i. Splices:
 - 1) Provide standard reinforcement splices by lapping ends, placing bars in contact, and tying tightly with wire. Comply with requirements of ACI 318 for minimum lap of spliced bars.
- j. Epoxy Coated Reinforcement:
 - 1) Rest epoxy coated steel members supported from formwork on coated wire bar supports, or on bar supports made of dielectric material or other suitable material.
 - 2) Coat wire bar supports with dielectric material for minimum distance of 2 in. from point of contact with coated steel member.
 - 3) Fasten epoxy-coated steel members with nylon-, epoxy-, or plastic-coated tie wire, or other suitable material acceptable to Engineer/Architect.
 - 4) Mechanical connections, when required, shall be installed in accordance with splice device manufacturer's recommendations. Repair any damage to coating.
 - 5) All parts of mechanical connections on epoxy-coated steel, including steel splice sleeves, bolts, and nuts shall be coated with same material used for repair of coating damage.
 - 6) Do not cut epoxy-coated steel unless permitted by Engineer/Architect. When cut, coat ends with material used for repair of coating damage.
 - 7) All welding of epoxy-coated steel shall conform to AWS D1.4.
 - 8) Adequate ventilation shall be provided when welding epoxy-coated steel.

- 9) After welding, repair coating damage as specified in Part 3 heading "Quality Control Testing During Construction," paragraph "Epoxy Coated Material."

WI 1.5 TEMPORARY SIGNAGE

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment and supervision necessary to provide and install and remove following completion of project, temporary signage as required for traffic control and user information during construction and as required by Owner/Engineer/Architect.

B. Materials

1. Temporary signage shall meet following minimum requirements:
 - a. Minimum size: 48" x 48"
 - b. Backing material: 0.5 in. medium density overlay plywood.
 - c. Colors:
 - 1) Background: medium orange or white.
 - 2) Symbols/Lettering: black
 - d. Lettering: silk screened or die-cut.
 - 1) Font Style: Helvetica or similar.
 - 2) Size: 2 in. high minimum for pedestrian information; 4 in. high minimum for traffic information.

C. Execution

1. Mounting height: 5 ft. to bottom of sign. Provide mounting brackets as required.
2. Contractor shall submit shop drawings detailing sign size, layout, colors, and mounting schemes for approval prior to fabricating signs and mounting brackets.
3. Typical regulatory signs (that is, STOP, YIELD, etc.) and "Handicap" signs shall conform to all Federal, state, and local requirements for sizes, materials, and colors.

WI 3.0 CONCRETE FLOOR REPAIR

A. Scope of Work

1. This Work consists of furnishing all labor, materials, equipment, floor scanning, supervision and incidentals necessary to locate and remove spalls and delaminated and unsound concrete, prepare cavities and install patching material to restore floor slab to original condition and appearance. Refer to Detail Series 3.0 for specific requirements.

B. Materials

1. Concrete repair materials shall be as specified in Section "Cast-in-Place Repair Mortar and/or Section "Latex Modified Concrete and Mortar."
2. Conventional steel reinforcement shall be as specified in Section "Cast-in-Place Concrete" and/or Work Item "Concrete Reinforcement."

C. Execution

1. Contractor shall locate and mark all Work areas as specified in Section "Surface Preparation for Patching," Article "Inspection."
2. **CAUTION: Post-tension tendons may be close or near the surface. Contractor shall have the floor scanned for reinforcement prior to proceeding with demolition work to ensure no damage occurs to embedded post-tension system and reinforcement. All floor repair locations shall be paint marked by the contractor and verified and approved by the Engineer. Contractor shall use extreme caution during concrete removal on the post-tension slabs. Procedure for delaminated, spalled and unsound concrete removal shall be as specified in Section "Surface Preparation for Patching," Article "Preparation." Remove all unsound concrete within marked boundary prior to any sawcutting and preparation of patch edges.**
3. Engineer/Architect shall inspect all cavities for condition according to Section "Surface Preparation for Patching," Article "Inspection of Repair Preparation."
4. All steel exposed within cavities shall be cleaned to bare metal by sandblasting as specified in Section "Surface Preparation for Patching," Article "Cleaning of Reinforcement within Delamination and Spall Cavities," and damaged and defective reinforcement replaced as specified in Section "Surface Preparation for Patching," Article "Reinforcement and Embedded Materials in Repair Areas." Exposed steel shall be coated with an approved corrosion inhibitor as specified in Work Item "Concrete Reinforcement."
5. Contractor shall prepare cavities for patch placement as specified in Section "Surface Preparation for Patching," Article "Preparation of Cavity for Patch Placement."
6. Patch materials and associated reference specifications are listed in Work Item "Concrete Floor Repair," Article "Materials," above. Patch installation procedures shall be in accordance with referenced specifications for selected material.

WI 3.1 FLOOR REPAIR – SLAB ON GRADE

- A. Refer to Work Item "Concrete Floor Repair" for scope of Work, materials and procedure associated with this Work Item. Refer to Detail 3.1 for specific requirements.

WI 3.2 FLOOR REPAIR - PARTIAL DEPTH

- A. Refer to Work Item "Concrete Floor Repair" for scope of Work, materials and procedure associated with this Work Item. Refer to Detail 3.2 for specific requirements.

WI 3.3 FLOOR REPAIR - FULL DEPTH

A. Scope of Work

1. This Work consists of furnishing all labor, materials, equipment, floor scanning and supervision and incidentals necessary to locate and remove full depth unsound floor concrete, furnish and install reinforcement if required, prepare cavity, and install patching material to restore floor to original integrity and appearance. Refer to Detail 3.3 for specific requirements.

B. Materials

1. Concrete repair materials shall be as specified in Section "Cast-in-Place Repair Mortar" and/or Section "Latex Modified Concrete and Mortar."
2. Conventional steel reinforcement shall be as specified in Section Work Item WI 1.3 "Concrete Reinforcement."

C. Execution

1. **CAUTION: Post-tension tendons may be close or near the surface. Contractor shall have the floor scanned for reinforcement prior to proceeding with demolition work to ensure no damage occurs to embedded post-tension system and reinforcement. All floor repair locations shall be paint marked by the contractor and verified and approved by the Engineer. Contractor shall use extreme caution during concrete removal on the post-tension slabs. Procedure for delaminated, spalled and unsound concrete removal shall be as specified in Section "Surface Preparation for Patching," Article "Preparation." Remove all unsound concrete within marked boundary prior to any sawcutting and preparation of patch edges.**
2. Contractor shall locate and mark all Work areas as specified in Section "Surface Preparation for Patching," Article "Inspection."
3. All concrete shall be removed from within marked boundaries until sound concrete is reached on all sides.
4. Sawcut shall then be made approximately 3 in. from edge of cavity. This sawcut shall be to depth of 0.75 in. and all edges shall be straight. Underside of slab shall have its repair edge ground to depth of 0.5 in. Patches shall be as square or rectangular-shaped as practical. All concrete within sawcut shall be removed to minimum depth of 0.75 in. Also see Section Surface Preparation for Patching," Article "Preparation."
5. Engineer/Architect shall inspect all cavities for condition according to Section "Surface Preparation for Patching," Article "Inspection of Repair Preparation."
6. All steel exposed within cavities shall be cleaned to bare metal by sandblasting according to Section "Surface Preparation for Patching," Article "Cleaning of Reinforcement within Delamination and Spall Cavities," and damaged and defective reinforcement replaced as specified in Section "Surface Preparation for Patching," Article "Reinforcement and Embedded Materials in Repair Areas." Exposed steel shall receive corrosion inhibitor coating as specified in Work Item "Concrete Reinforcement."

7. Contractor shall prepare cavities for patch placement as specified in Section "Surface Preparation for Patching," Article "Preparation of Cavity for Patch Placement."
8. Patch materials and associated reference specifications are listed in Work Item "Floor Repair - Full Depth," Article "Materials," above. Patch installation procedures shall be in accordance with referenced specifications for selected material.

WI 3.4 FLOOR REPAIR – CURBS / WALKS

A. Scope of Work

1. This Work consists of furnishing all labor, materials, equipment, supervision and incidentals necessary to locate existing spalls, locate and remove delaminated and unsound concrete from curbs, prepare cavities and install patching material to restore curbs to original condition and appearance. Refer to Detail 3.4 for specific requirements.

B. Materials

1. Concrete repair materials shall be as specified in Section "Latex Modified Concrete and Mortar."
2. Conventional steel reinforcement shall be as specified in Work Item WI 1.3 "Concrete Reinforcement."

C. Execution

1. Contractor shall locate and mark all Work areas as specified in Section "Surface Preparation for Patching," Article "Inspection."
2. Procedure for delaminated, spalled and unsound concrete removal shall be as specified in Section "Surface Preparation for Patching," Article "Preparation." Remove all unsound concrete within marked boundaries prior to sawcutting and preparation of patch edges.
3. Engineer/Architect shall inspect all cavities for condition according to Section "Surface Preparation for Patching," Article "Inspection of Repair Preparation."
4. All steel exposed within cavities shall be cleaned to bare metal by sandblasting as specified in Section "Surface Preparation for Patching," Article "Cleaning of Reinforcement within Delamination and Spall Cavities," and damaged reinforcement replaced as specified in Section "Surface Preparation for Patching," Article "Reinforcement and Embedded Materials in Repair Areas." Exposed steel shall be coated with an approved corrosion inhibitor coating as specified in Work Item "Concrete Reinforcement."
5. Contractor shall prepare cavities for patch placement as specified in Section "Surface Preparation for Patching," Article "Preparation of Cavity for Patch Placement."
6. Patch materials and associated reference specifications are listed in Work Item "Floor Repair - Curbs," Article "Materials," above. Patch installation procedures shall be in accordance with referenced specifications for selected material.

WI 3.5 FLOOR REPAIR – CONCRETE P/T SLAB

A. Scope of Work

1. This Work consists of furnishing all labor, materials, equipment, supervision and incidentals necessary to locate damaged P/T tendons and install a new structural steel angle per Detail 3.5.

B. Materials

1. HSNS grout, submitted to the Engineer for review and approval.
2. 10x4x1/2" shim plate,
3. 10x6x1/2" shim plate
4. L8x8x1/2" or Engineer approved alternate,
5. 7 1/2x7 1/2x1/4" stiffener,
6. 8x8x1/2"x8 LNS
7. 1/2" Dia. A325 bolt,
8. 1/2" Dia. HILTI SS Kwik Bolt TZ. By Hilti Corporation.
9. Steel plate and bar shall be ASTM A36 steel, Fy = 36,000 PSI.
10. Structural steel shapes shall be ASTM A992 steel, Fy = 50,000 PSI.
11. Bolts, nuts and washers shall be ASTM A325, Fy = 120,000 PSI (105,000 PSI).
12. Welding electrodes shall be E7018, per AWS D1.1, latest edition.
13. H. S. S. sections shall be ASTM A36 Grade A, 36,000 PSI
14. Paint coating primer shall be Sherwin Williams Macropoxy 646fc primer.
15. Paint coating finish coat shall be Sherwin Williams Acrolon with Urethane finish coat.

C. Execution

1. Contractor shall locate and mark installation locations where damaged P/T tendons shall be repaired by installation of structural angles for Engineer's review and approval prior to completing work.
2. If required, see Work Item 4.1 to perform concrete ceiling repairs prior to installation of steel framing.
3. Contractor shall install new steel angle, shims, and anchors per Detail 3.5.
4. Grout fill in between shim plates full width and length of angle.

WI 3.8 FLOOR REPAIR – SCALED CONCRETE SURFACE

A. Scope of Work

1. This work consists of furnishing all labor, materials, equipment, supervision and incidentals necessary to locate scaled concrete, remove unsound and sound concrete to facilitate the repair process, prepare surface and fill prepared repair cavities with materials to match existing floor surface and appearance.

B. Materials

1. Concrete materials shall be as specified in Section "Latex Modified Concrete and Mortar."

C. Execution

1. Contractor shall locate and mark all work areas as specified in Section "Surface Preparation for Patching," Article "Inspection." All areas shall be marked and verified by the Engineer before beginning surface preparatory work.
2. Concrete shall be milled down to the depth of the affected concrete within the outlined areas to a uniform depth as shown on the drawings. Equipment shall have positive control over depth of concrete removal.
3. Contractor shall shotblast floor surface prior to placing repair material application.
4. Surface shall then be cleaned by air blasting.
5. Engineer/Architect shall inspect surface for condition according to Section "Surface Preparation for Patching," Article "Inspection of Repair Preparation."
6. Surface must be clean and dry. Contractor shall apply latex concrete material in a continuous monolithic process with the new cast concrete finished flush with the existing concrete surface.

WI 4.0 CONCRETE CEILING REPAIR

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, supervision and incidentals necessary to locate existing spalls, locate and remove delaminated and unsound concrete, prepare cavities and install patching material to restore ceilings to original condition and appearance. Refer to Detail Series 4.0 for specific requirements.

B. Materials

1. Trowel applied patching material shall be as specified in Section "Trowel Applied Mortar." This material may be used for shallow removal and repair Work Items only.

C. Execution

1. **CAUTION: Post-tension tendons may be close or near the surface. Contractor shall have the floor scanned for reinforcement prior to proceeding with demolition work to ensure no damage occurs to the embedded post-tension system and reinforcement. All floor repair locations shall be paint marked by the contractor and verified and approved by the Engineer. Contractor shall use extreme caution during concrete removal on the post-tension slabs. Procedure for delaminated, spalled and unsound concrete removal shall be as specified in Section "Surface Preparation for Patching," Article "Preparation." Remove all unsound concrete within marked boundary prior to any sawcutting and preparation of patch edges.**

2. Contractor shall locate and mark all Work areas as specified in Section "Surface Preparation for Patching," Article "Inspection."
3. Procedure for delaminated, spalled and unsound concrete removal shall be as specified in Section "Surface Preparation for Patching," Article "Preparation."
4. Engineer/Architect shall inspect all cavities for condition according to Section "Surface Preparation for Patching," Article "Inspection of Repair Preparation."
5. All steel exposed within cavities shall be cleaned to bare metal by sandblasting as specified in Section "Surface Preparation for Patching," Article "Cleaning of Reinforcement within Delamination and Spall Cavities," and damaged and defective reinforcement replaced as specified in Section "Surface Preparation for Patching," Article "Reinforcement and Embedded Materials in Repair Areas." Exposed steel shall be coated with an approved corrosion inhibitor coating as specified in Work Item "Concrete Reinforcement."
6. Contractor shall prepare cavities for patch placement in accordance with Section "Surface Preparation for Patching," Article "Preparation of Cavity for Patch Placement."
7. Patch materials and associated reference specifications are listed in Work Item "Concrete Ceiling Repair," Article "Materials," above. Patch installation procedures shall be in accordance with referenced specifications for selected material.

WI 4.1 CEILING REPAIR - PARTIAL DEPTH

- A. Refer to Work Item "Concrete Ceiling Repair" for scope of Work, materials and procedure associated with this Work Item. Refer to Detail 4.1 for specific requirements.

WI 6.0 CONCRETE COLUMN REPAIR

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, shoring, supervision and incidentals necessary to locate existing spalls, locate and remove delaminated and unsound concrete, prepare cavities and install patching materials to restore concrete columns to original condition and appearance. Refer to Detail Series 6.0 for specific requirements.

B. Materials

1. Concrete repair materials shall be as specified in Section "Cast-in-Place Concrete Repair Mortar /or Section "Latex Modified Concrete and Mortar."
2. Trowel applied patching material shall be as specified in Section "Trowel Applied Mortar." This material may be used for shallow removal and repair Work Item only.

C. Execution

1. Contractor shall locate and mark all Work areas as specified in Section "Surface Preparation for Patching," Article "Inspection."

2. Procedure for delaminated and unsound concrete removal shall be as specified in Section "Surface Preparation for Patching," Article "Preparation."
3. Engineer/Architect shall inspect all cavities for condition according to Section "Surface Preparation for Patching," Article "Inspection of Repair Preparation."
4. All steel exposed within cavities shall be cleaned to bare metal by sandblasting according to Section "Surface Preparation for Patching," Article "Cleaning of Reinforcement within Delamination and Spall Cavities," and damaged and defective reinforcement replaced as specified in Section "Surface Preparation for Patching," Article "Reinforcement and Embedded Materials in Repair Areas." Exposed steel shall be coated with an approved corrosion inhibitor as specified in Section "Concrete Reinforcement."
5. Contractor shall prepare cavities for patch placement as specified in Section "Surface Preparation for Patching," Article "Preparation of Cavity for Patch Placement."
6. Patch materials and associated reference specifications are listed in Work Item "Concrete Column Repair," Article "Materials," above. Patch installation procedures shall be in accordance with referenced specifications for selected material.

WI 6.1 COLUMN REPAIR – PARTIAL DEPTH

- A. Refer to Work Item "Concrete Column Repair" for scope of Work, materials and procedure associated with this Work Item. Refer to Detail 6.1 for specific requirements.

WI 7.0 CONCRETE WALL REPAIR

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, supervision and incidentals necessary to locate existing spalls, locate and remove delaminated and unsound concrete, prepare cavities and place patching materials to restore concrete walls to original condition and appearance. Refer to Detail Series 7.0 for specific requirements.

B. Materials

1. Trowel applied patching material shall be as specified in Section "Trowel Applied Mortar." This material may be used for shallow removal and repair Work Item only.

C. Execution

1. Contractor shall locate and mark all Work areas as specified in Section "Surface Preparation for Patching," Article "Inspection."
2. Procedure for delaminated, spalled and unsound concrete removal shall be as specified in Section "Surface Preparation for Patching," Article "Preparation."
3. Engineer/Architect shall inspect all cavities for condition according to Section "Surface Preparation for Patching," Article "Inspection of Repair Preparation."

4. All steel exposed within cavities shall be cleaned to bare metal by sandblasting according to Section "Surface Preparation for Patching," Article "Cleaning of Reinforcement within Delamination and Spall Cavities," and damaged and defective reinforcement replaced as specified in Section "Surface Preparation for Patching," Article "Reinforcement and Embedded Materials in Repair Areas." Exposed steel shall be coated with an approved corrosion inhibitor coating as specified in Section "Cast-in-Place Concrete."
5. Contractor shall prepare cavities for patch placement as specified in Section "Surface Preparation for Patching," Article "Preparation of Cavity for Patch Placement."
6. Patch materials and associated reference specifications are listed in Work Item "Concrete Wall Repair," Article "Materials," above. Patch installation procedures shall be in accordance with referenced specifications for selected material.

WI 7.1 WALL REPAIR - PARTIAL DEPTH

- A. Refer to Work Item "Concrete Wall Repair" for scope of Work, materials and procedure associated with this Work Item. Refer to Detail 7.1 for specific requirements.

WI 9.0 CRACKS AND JOINTS - EXPANSION JOINT EDGE PREPARATION

WI 9.1 EXPANSION JOINT PREPARATION – NEW BLOCKOUT

- A. Scope of Work
 1. Work consists of furnishing all labor, materials, equipment, supervision and incidentals necessary to locate the Work area, remove sound concrete if required, and prepare and install repair material to form new expansion joint blockout to receive new seal system. Refer to Detail 9.1 for specific requirements and installation conditions. This Work shall be coordinated with Work Item "Expansion Joint Repair and Replacement."
- B. Materials
 1. Concrete repair materials shall be as specified in Section "Latex Modified Concrete and Mortar."
 2. Trowel applied material shall be as specified in Section "Trowel Applied Mortar."
- C. Execution
 1. Contractor shall remove existing expansion materials in manner that minimizes damage to adjacent concrete. Alterations to existing expansion joint blockout required for installation of new expansion joint system shall be performed in accordance with Work Item "Expansion Joint Preparation – New Blockout" and Section "Surface Preparation for Patching."
 2. Contractor shall locate and mark all expansion joint installation areas as located on Drawings.

3. All concrete requiring removal from within marked boundaries shall be sawcut and chipped to dimensions detailed. Caution shall be exercised during sawcutting operations to avoid damaging existing reinforcement near surface of concrete.
4. Spalls and delaminations located within blockout shall be patched in accordance with Work Item "Concrete Floor Repair."
5. Repair materials and associated reference specifications are listed in Work Item "Expansion Joint Preparation – New Blockout," Article "Materials," above. Repair installation procedures shall be in accordance with referenced specifications for selected material.

WI 10.0 EXPANSION JOINT REPAIR AND REPLACEMENT

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, supervision and incidentals necessary to remove existing expansion joints, prepare adjacent concrete and furnish and install new expansion joint system. Refer to Detail Series 10.0 for specific requirements.

B. Materials

1. Expansion joint system materials shall be as specified in Section "Expansion Joints System," installed in strict accordance with manufacturer's recommendations.
2. Concrete repair materials shall be as specified in Section "Latex Modified Concrete and Mortar."
3. Trowel applied material shall be as specified in Section "Trowel Applied Mortar."

C. Execution

1. Contractor shall remove existing expansion materials in manner that minimizes damage to adjacent concrete. Alterations to existing expansion joint blockout required for installation of new expansion joint system shall be performed in accordance with Work Item "Floor Repair - Provide Expansion Joint Blockout" and Section "Surface Preparation for Patching."
2. Joint materials and associated reference specifications are listed in Work Item "Expansion Joint Repair and Replacement," Article "Materials," above. Joint installation procedures shall be in accordance with referenced specifications and manufacturer's recommendations.

WI 10.1 NEW EXPANSION JOINT @ CURB

- A. Refer to Work Item "Expansion Joint Repair and Replacement" for scope of Work, materials and procedure associated with this Work Item. Refer to Detail 10.1 for specific requirements.

WI 10.2 EXPANSION JOINT @ STAIRWAY

- A. Refer to Work Item "Expansion Joint Repair and Replacement" for scope of Work, materials and procedure associated with this Work Item. Refer to Detail 10.2 for specific requirements.

WI 11.0 CRACK AND JOINT REPAIR

WI 11.1 SEAL CRACKS AND JOINTS (INCIDENTAL TO WORK ITEM SERIES 16.0)

- A. Scope of Work
1. Work consists of furnishing all labor, materials, equipment, supervision and incidentals necessary to locate, prepare and seal random cracks and unsealed construction joints in concrete floor and/or topping. Refer to Detail 11.1 for specific requirements.
- B. Materials
1. Approved materials for use in this Work are specified in Section "Concrete Joint Sealants."
- C. Execution
1. Contractor shall thoroughly clean and inspect concrete slabs and/or topping for cracks and unsealed construction joints. Those identified as either greater than 0.03 in. wide or showing evidence of water and/or salt staining on ceiling below shall be sealed. All cracks and joints identified for repair shall be marked with chalk to aid in precision routing. Obtain depths to top reinforcing bars and P-T tendons in area of repair by use of a pachometer. Determine depth of electrical conduit (metal or plastic). Do not exceed this depth of routing where the crack to be repaired crosses the embedded items. Damage to embedded items will require repair or replacement at no cost to the Owner.
 2. Cracks and construction joints shall be ground or sawcut to an adequate width and depth as required by Work Item Detail. Routing shall be performed by mechanized device that has positive mechanical control over depth and alignment of cut. Hand held power grinders with abrasive disks shall not be used on control/construction joints, but may be used on random cracks.
 3. Cavities shall be thoroughly cleaned by either sandblasting or grinding to remove all laitance, unsound concrete and curing compounds which may interfere with adhesion. Groove shall be air blasted to remove remaining debris.
 4. Sealant materials and associated reference specifications are listed in Work Item "Seal Cracks and Construction Joints," Article "Materials," above. Sealant installation procedures shall be in accordance with referenced specifications for selected material.
 5. Traffic topping manufacturer shall specify joint sealant type compatible with traffic topping. Crack and joint sealant work shall be incidental to traffic topping system.

WI 11.2 REPAIR CRACK/JOINT SEALANT

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, supervision and incidentals necessary to locate and mark failed joint sealant, remove existing sealant, prepare edges and reseal joints and cracks. Refer to Detail 11.2 for specific requirements.

B. Materials

1. Approved materials for use in this Work are specified in Section "Concrete Joint Sealants."

C. Execution

1. Contractor shall locate failed crack/joint sealant by visual inspection.
2. Contractor shall remove existing sealant from joints and/or cracks.
3. When existing joint dimensions do not conform to Detail 11.2, joints shall be routed or sawcut to an adequate width and depth as required by Work Item Detail. Routing shall be performed by mechanized device that has positive mechanical control over depth and alignment of cut.
4. Cavities shall be thoroughly cleaned by either sandblasting or grinding to remove all remaining sealant and unsound concrete which may interfere with adhesion. Groove shall also be air blasted to remove remaining debris.
5. Install sealants in accordance with sealant manufacturer's instructions and the specification Section "Joint Sealants."
6. Traffic topping manufacturer shall specify joint sealant type compatible with traffic topping. Crack and joint sealant work shall be incidental to traffic topping system.

WI 11.3 VERTICAL JOINT SEALANT

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, supervision and incidentals necessary to locate and install vertical joint sealant as shown on Drawings at stair tower location.

B. Materials

1. Materials used shall be as specified in Section "Concrete Joint Sealants."

C. Execution

1. Contractor shall locate and mark Work areas as located on Drawings.
2. Joint shall be cleaned by sand and air blasting.
3. Sealant shall be tooled concave. (No wet tooling will be allowed.) Joint preparation, backer rod and bond breaker shall be in accordance with sealant

manufacturer's recommendations. Sealant materials shall be in accordance with specification Section "Joint Sealants."

WI 11.4 TOOL AND SEAL CONTROL JOINTS (INCIDENTAL TO WI SERIES 3.0)

A. Scope of Work

1. Work consists of providing all labor, materials, equipment, supervision and incidentals necessary to provide sealed control joints in concrete overlay as shown on Drawings. Refer to Detail 11.4 for specific requirements.

B. Materials

1. Sealant materials shall be as specified in Section "Concrete Joint Sealants."

C. Execution

1. Contractor shall locate and provide control joints at all column grid lines and at all existing control and construction joints.
2. Control joints shall be tooled and formed in plastic concrete. Sawcutting joints after concrete sets will not be allowed.
3. Tooled joints shall be of proper dimension in plastic concrete.
4. Approved joint materials shall be installed as specified in referenced specification section listed in Work Item "Concrete Joint System," Article "Materials."

WI 11.5 EPOXY INJECTION

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, supervision and incidentals necessary to locate column cracks, prepare and pressure inject approved cracks with an epoxy resin so as to create waterproof barrier and/or structural repair as indicated in the Drawings.

B. Materials

1. Epoxy injection materials shall be as specified in Section "Epoxy Injection Systems."

C. Execution

1. Epoxy injection materials shall be installed in accordance with Section "Epoxy Injection Systems."
2. Contractor is responsible for location and mark out of all cracks with chalk requiring epoxy injection prior to start of Work.
3. Engineer/Architect will verify all cracks to be epoxy injected.

4. No payment will be allowed for Work executed prior to Engineer/Architect inspection and verification.

WI 11.7 COVE SEALANT (INCIDENTAL TO WORK ITEM 16.5)

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, supervision and incidentals necessary to prepare concrete surfaces and install cove sealant between floor and vertical surfaces as shown on Drawings. Refer to Detail 11.7 for specific requirements.

B. Materials

1. Joint sealant materials shall be as specified in Section "Concrete Joint Sealants."
2. Joint sealant material shall be compatible with traffic topping materials specified in Section "Traffic Coatings."

C. Execution

1. Wall-floor intersection to be sealed shall be thoroughly cleaned by sandblasting to remove all contaminants and foreign material.
2. Entire Work area shall then be cleaned with compressed air to assure that all loose particles have been removed and that intersection is dry.
3. Properly prepared intersection shall be coated evenly and completely with joint primer material on each of intersecting faces in accordance with sealant manufacturer's recommendations.
4. After primer has cured, apply cove sealant to intersection such that sealant extends 0.75 in. onto each of intersecting faces.
5. Work cove sealant into joint so that all air is removed and tool to concave shape such that minimum throat dimension of no less than 0.5 in. is maintained.
6. Remove excess sealant and allow to cure.
7. Apply coating on horizontal and vertical surfaces where shown on Drawings in even layers in strict accordance with manufacturer's recommendations. Sealant material and associated reference specifications are listed in Work Item "Cove Sealant," Article "Materials," above for traffic topping coating materials and installation requirements.

WI 15.0 CONCRETE SEALER

A. Scope of Work

1. Work consists of providing all labor, materials, equipment, supervision and incidentals necessary to prepare surfaces and install protective sealer system on concrete surfaces exposed to vehicular and/or pedestrian traffic including curbing and bumper walls as shown on Drawings as required.

B. Materials

1. Protective sealer system materials shall be as specified in Section "Water Repellents."

C. Execution

1. All surfaces scheduled to receive protective sealer system shall be identified by Contractor. Mark with chalk all areas other than floor surfaces which are to be treated.
2. Floor surfaces shall be prepared by shotblast in accordance with Section "Water Repellents."
3. All other surfaces to be treated shall be brushed, water blasted, or sandblasted as required and then air blasted prior to application. Use of water blasting on vertical or overhead surfaces requires adequate drying time before application to achieve proper penetration.
4. Sealer application shall be as specified in referenced specification section listed in Work Item "Protective Sealer," Article "Materials," above. Overhead and vertical surface application shall be by brush or pressure sprayer.

WI 15.1 CONCRETE SEALER - FLOORS

- A. Refer to Work Item "Protective Sealer" for scope of Work, materials and procedure associated with this Work Item.

WI 16.0 TRAFFIC TOPPING

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, supervision and incidentals, including installation of joint sealant materials, necessary to prepare existing floor surface and install traffic topping as shown on Detail 16.5 and Drawings. Coating of all vertical floor upturn surfaces within Work area shall be incidental to installation of traffic coating application.

B. Materials

1. Approved materials for use in this Work are as specified in Section "Traffic Coatings."

C. Execution

1. Floor surface preparation shall be performed by coating system applicator or under its direct supervision. Shotblast surface preparation is required for floors.
2. Traffic topping shall be installed by licensed applicators in strict accordance with manufacturer's recommendations and referenced specification section listed in Work Item "Traffic Topping," Article "Materials," above. Crack preparation, including installation of joint sealant material where required, is incidental to traffic topping work.

3. Coating system shall be thoroughly cured prior to Work areas being returned to service.

WI 16.2 TRAFFIC TOPPING - COLUMNS ON TOP LEVEL

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, supervision and incidentals necessary to prepare existing concrete column surfaces and install traffic coating and sealer at locations shown in Construction Documents per Detail 16.2.
2. Installation of new crack and/or joint sealant as part of proper substrate preparation for coating installation shall be paid for under other Work Items, unless noted otherwise.

B. Materials

1. Approved materials for use in this Work are as specified in Section "Traffic Coatings."
2. Approved materials for use in this Work as specified in Section "Water Repellants"

C. Execution

1. Surface preparation shall be performed by coating system applicator or under its direct supervision.
2. Contractor shall locate and layout Work areas as indicated on Drawings.
3. Contractor shall clean all concrete surfaces to be coated by pressure washing, grinding, shotblasting and other methods as required by the manufacture to remove all contaminants the would affect proper bonding adhesion of the coating to the concrete.
4. Contractor shall prepare surface to be coated in accordance with manufacturer's recommendations. Contractor shall submit a written statement from the manufacture that surface preparations are acceptable for application of their new coating to the existing surfaces prior to beginning coating application.
5. Protect adjacent non-coated surfaces from being coated. Mask off adjacent features not receiving coating. Contractor caused damage to elements not scheduled for coating application shall be cleaned and/or repaired to satisfaction of the Owner and at no additional cost to Owner.
6. Install mock up installation area, and receive Owner approval of application results, color, texture and finished appearance prior to proceeding with additional application.
7. Contractor shall apply primer and/or coating in accordance with referenced specification section, and manufacturer's recommendations.
8. Traffic coating shall be installed by licensed applicators in strict accordance with manufacturer's recommendations and referenced specification section.
9. Coating system and sealer shall be thoroughly cured prior to Work areas being returned to service.

WI 16.5 TRAFFIC TOPPING – RECOAT (COMPLETE SYSTEM)

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, supervision and incidentals, including preparation and installation of crack, joint and cove sealant materials, necessary to prepare and recoat the existing traffic topping as shown on Drawings.

B. Materials

1. Approved materials for use in this Work are as specified in Section " Traffic Coatings." Traffic topping recoating material shall be compatible with existing system.
2. Existing membrane is as follows:
 - a. It appears as though the existing traffic topping is fluid-applied urethane system.
3. Prior to start of Work, obtain written approval from traffic topping manufacturer that the existing surface is acceptable for application of proposed traffic topping and that the membrane is compatible with existing system.

C. Execution

1. Preparation of existing traffic topping membrane shall be in strict accordance with manufacturer's recommendations and Section " Traffic Coatings." Floor surface preparation shall be performed by coating system applicator or under its direct supervision.
2. Traffic topping shall be installed by licensed applicators in strict accordance with manufacturer's recommendations and Section "Traffic Coatings." Preparation and installation of crack, joint, and cove sealant material, where required, is incidental to this Work Item.
3. Completely solvent-wash all existing traffic coating that is bonded to concrete slab.
4. All loose existing coating shall be removed and exposed concrete surfaces prepared in accordance with manufacturer's requirements. See Section " Traffic Coatings."
5. Prior to recoating the area, any patches and/or bare concrete areas shall be coated with a base coat and an appropriate number of intermediate coats to bring the new membrane up to the level of the existing membrane. After this has been completed, the entire area will be recoated.
6. Existing traffic topping membrane shall be recoated with a minimum of one intermediate coat with aggregate and one top coat.
7. Coating system shall be thoroughly cured and traffic marking completed prior to returning work areas to service.

WI 20.0 P/T SYSTEM REPAIR (BUTTONHEAD)

WI 20.2 PROTECT EXPOSED P/T TENDON(S)

A. Scope of Work

1. This work consists of furnishing all labor, materials, equipment, supervision and incidentals necessary to remove damaged tendon sheathing, re-grease (or epoxy coat tendons as approved by Engineer) in damaged area and install sheathing. Concrete work performed in association with this work will be paid incidentally under Work Item series 3.0. Refer to Detail 20.2 for specific requirements.

B. Materials

1. Sheathing Repair Tape:
 - a. "3M Tape No. 226," 3M, St. Paul, MN.
 - b. "Polyken 826," Berry Plastics Corp, Evansville, IN
 - c. "Tyco Adhesives No. 398," Tyco Adhesives, Franklin, MA

C. Execution

1. Remove damaged sheathing materials from exposed tendon.
2. Grease coating:
 - a. Apply additional corrosion-inhibiting grease over the damaged area to completely fill any void or surface depression caused by the sheathing damage.
3. Epoxy coating option (use only as approved by Engineer).
 - a. Clean tendon to remove grease residue from exposed tendon.
 - b. Apply uniform coating of epoxy to exposed tendon.
4. Install split sheathing over exposed tendon. Sheathing shall overlap existing sheathing by at least two inches at each end. Sheathing shall be oriented such that the split is toward the bottom.
5. Tape entire length of repair, spirally wrapping tape around sheathing to provide at least two layers of tape. Taping shall overlap existing sheathing by 2 in. at each end.

WI 25.0 MECHANICAL - DRAINAGE

WI 25.1 MECHANICAL – ALLOWANCE

A. Scope of Work

1. Mechanical and electrical allowance shall be all related utility work (drain lines, sprinkler lines, electrical conduit, junction boxes, etc.) associated with interruptions of these utilities to repair existing structural areas.
2. All utilities removed during Work shall be reinstalled in accordance with latest edition of electrical and mechanical codes in effect. Work ineligible for allowance

includes Work covered by or incidental to Work Items within this Specification or for Work required through Contractor's negligence.

B. Method of Payment

1. Mechanical/electrical Work, as approved in writing by Engineer/Architect prior to implementation, shall be paid for by Contractor. Contractor shall forward actual invoices from mechanical/electrical contractors and General Contractor's markup to Engineer/Architect with each pay request. Contractor shall attach actual invoices to written authorization. At completion of project, any variation between mechanical allowance and actual payment receipts will be reflected in an adjustment of allowance amount.

WI 25.6 MECHANICAL – CLEAN EXISTING DRAINS AND PIPING

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, supervision and incidentals necessary to clean drains, collectors/pits, and piping in the garage for adequate drainage.

B. Materials: None specified.

C. Execution

1. Work shall commence after all concrete operations that leave slurry or similar debris in or near drains.
2. Clean and flush all drains within parking structure to remove debris buildup and accumulation, to include collector/pit areas.
3. All drains within the parking structure shall be kept free-flowing throughout the duration of the project. Work shall also include replacement of any damaged drain grates.
4. Equipment shall be equal to or better than 4000 psi water jet flusher with no less than 15 gpm at nozzle end.
5. To insure the proper cleaning of the lines and adequate footage is being cleaned, a daily log shall be filled out to show the amount of progress and amount of debris each day, which shall be turned in daily to the Engineer. Contractor will be required to provide a written summary of all drain locations, date each drain and drain line cleaned and tested, verifications or proper flow upon completion of construction for each parking structure. Contractor shall provide sample format of report for approval by the Engineer prior to performing Work.

WI 45.0 PAINTING

WI 45.1 PAINT TRAFFIC MARKINGS

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, supervision and incidentals necessary to locate, layout and paint parking stall stripes, traffic arrows, crosswalks, accessible stall access aisles, curbs, symbols, stop bars and all other existing pavement markings.
2. Stripes shall match all existing marks and be provided at same locations.
3. Remove existing stripes in those locations where they conflict with new striping layout.

B. Materials

1. Painting materials shall be chlorinated rubber based as specified in Section "Pavement Marking."

C. Execution

1. Contractor shall prepare drawing of existing parking layout in repair areas prior to starting with repairs. Contractor shall note stall width, angle of parking, directional traffic arrows and all other existing pavement markings.
2. Contractor shall submit striping plan for Engineer/Architect's approval.
3. Contractor shall locate and layout Work areas as indicated on Drawings and shall match existing pavement markings, except as directed otherwise by Engineer/Architect.
4. Where existing pavement markings conflict with new striping layout, remove conflicting pavement markings as indicated in Division 9 Section "Pavement Marking."
5. Engineer/Architect shall inspect all layout and surface preparation for conditions in accordance with Section "Pavement Marking."
6. Paint materials and associated referenced specifications are listed in Article "Materials," above. Procedures shall be in accordance with referenced specifications.

WI 83.0 PRECAST CONCRETE FAÇADE REPAIR

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, supervision and incidentals including shoring necessary to locate, support and repair damaged or deteriorated tee beams. Refer to Detail Series 83.0 for specific requirements.

B. Materials/Equipment

1. Trowel applied patching material shall be as specified in Section "Trowel Applied Mortar." This material may be used for shallow removal and repair Work Items only.
2. Concrete repair materials shall be as specified in Section "Cast-in Place Repair Mortar"
3. Chipping hammers shall be 15 lb or less unless directed by Engineer/Architect.

C. Execution

1. Contractor shall locate and mark tee beam repairs indicated on Drawings according to Section "Surface Preparation for Patching," Article "Inspection."
2. Contractor shall provide shoring as required in accordance with Section "Cast-in-Place Concrete." Submit Shop Drawings according to Section "Submittals" and receive Engineer/Architect's approval prior to starting removal operations.
3. Procedure for delaminated, spalled and unsound concrete removal shall be as specified in Section "Surface Preparation for Patching," Article "Preparation."
4. Engineer/Architect shall inspect all cavities for condition according to Section "Surface Preparation for Patching," Article "Inspection of Repair Preparation."
5. All steel exposed within cavities shall be cleaned to bare metal by sandblasting as specified in Section "Surface Preparation for Patching," Article "Cleaning of Reinforcement within Delamination and Spall Cavities," and damaged reinforcement replaced as specified in Section "Surface Preparation for Patching," Article "Reinforcement and Embedded Materials in Repair Areas." Exposed steel shall be coated with approved corrosion inhibitor coating as specified in Section "Concrete Reinforcement."
6. Contractor shall prepare cavities for patch placement in accordance with Section "Surface Preparation for Patching," Article "Preparation of Cavity for Patch Placement."
7. Patch materials and associated reference specifications are listed in Work Item "Precast Concrete Façade," Article "Materials," above. Patch installation procedures shall be in accordance with referenced specifications for selected material.
8. Contractor shall maintain forms and shores in place until concrete has attained at least 75% of 28-day strength.

WI 83.3 REPAIR PRECAST PANEL

- A. Refer to Work Item "Precast Concrete Façade Repair" for scope of Work, materials and procedure associated with this Work Item. Refer to Detail 83.3 for specific requirements.

WI 90.0 FAÇADE AND STAIR TOWER CLEANING (ALTERNATE WORK)

- A. Scope of Work
 1. Work consists of furnishing all labor, materials, equipment, supervision and incidentals necessary to clean façade and stair tower surfaces using approved cleaning products and techniques.
 2. Preliminary work includes sample mock-up cleanings using various combinations of cleaning products and techniques to establish required end results to be applied to the balance of areas to be cleaned.
 3. Work includes pre-treatment, containment, post-treatment and disposal of run-off/by-products from cleaning operations as required to meet local requirements of jurisdiction where project is located. Coordinate and verify requirements with local agencies as required prior to start of cleaning work.
- B. Materials

1. Cleaning products used shall not damage substrates. Use only products shown to effectively clean substrates without damage. Submit to Engineer for review.
2. Cleaning/rinse water shall be potable water with mineral content that will not stain cleaned building surfaces. Treat/filter water prior to use if required to eliminate staining potential.
3. Equipment used for application of cleaning products/media shall be adjusted and calibrated as required on an ongoing basis to keep from damaging existing substrates.
4. Specific products and techniques shall be as stated in the applicable work items.

C. Execution

1. Perform sample cleaning mock-ups as described in “Scope of Work” at existing building location(s) determined by Owner and Engineer.
2. Mask all surfaces that may be adversely affected by run-off from cleaning operations. Do not allow cleaning materials/run-off to enter building air intakes, coordinate work at and near these areas with building operations staff.
3. Perform cleaning at times acceptable to Owner with regard to impact of cleaning materials and operations on building operations and impact on the general public, pedestrians and property surrounding the project site.
4. If required by local codes/regulations, collect and treat run-off water to levels acceptable for release to local sewers.
5. Rinse all surfaces after cleaning as required to remove all residual cleaning materials. More than one rinse may be required depending on cleaning materials and building conditions.

WI 90.1 CLEAN FAÇADE – DETERGENT AND PRESSURE WASHING (ALTERNATE WORK)

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, supervision and incidentals necessary to clean façade surfaces and Top Level interior bumper wall surfaces using detergent, brush/scrapper scrubbing and pressurized water.
2. See Work Item “Façade Cleaning” for additional general requirements for cleaning operations.

B. Materials

1. See Work Item “Façade Cleaning” for general material requirements for cleaning operations.
2. Detergents shall be mild, general purpose detergent/cleaning agent that is biodegradable and does not create excessive foaming.
3. Pressure washing equipment shall be adjusted to acceptable pressure that does not damage existing facade. Adjust pressure as required on an ongoing basis to keep from damaging existing substrates.

C. Execution

1. See Work Item “Façade Cleaning” for execution requirements for cleaning operations.

WI 90.2 CLEAN STAIR TOWER INTERIOR – DETERGENT AND PRESSURE WASHING (ALTERNATE WORK)

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, supervision and incidentals necessary to clean interior stair tower surfaces using detergent, brush/scrapper scrubbing and pressurized water.
2. See Work Item “Façade Cleaning” for additional general requirements for cleaning operations.

B. Materials

1. See Work Item “Façade Cleaning” for general material requirements for cleaning operations.
2. Detergents shall be mild, general purpose detergent/cleaning agent that is biodegradable and does not create excessive foaming.
3. Pressure washing equipment shall be adjusted to acceptable pressure that does not damage existing facade. Adjust pressure as required on an ongoing basis to keep from damaging existing substrates.

C. Execution

1. See Work Item “Façade Cleaning” for execution requirements for cleaning operations.

WI 91.0 FAÇADE COATING / PAINTING / STAINING

WI 91.3 CLEAR PENETRATING SEALER (ALTERNATE WORK)

A. Scope of Work

1. Work consists of providing all labor, materials, equipment, supervision and incidentals necessary to prepare surfaces and install penetrating sealer system on exterior masonry or concrete façade surfaces.

B. Materials

1. Penetrating sealer system materials shall be as specified in Section “Water Repellents”

C. Execution

1. All surfaces scheduled to receive penetrating sealer system shall be identified by Contractor.
2. Surfaces shall be cleaned/prepared in accordance with referenced specification section(s). All surfaces shall be treated with a minimum combination of detergent and brush scrubbing followed by water pressure washing.
3. If indicated, additional surface preparation of sandblasting followed by air blasting is required prior to detergent and water pressure washing preparation noted above.
4. Use of water pressure washing requires adequate drying time before application to achieve proper penetration.
5. Mask all surfaces not scheduled for penetrating sealer application to prevent damage to architectural elements. Contractor caused damage to elements not scheduled for sealer application shall be cleaned and/or repaired to satisfaction of the Owner and at no additional cost to Owner.
6. Overhead and vertical surface application shall be by brush or pressure sprayer.
7. Sealer application shall be as specified in referenced specification section listed in "Materials" above.

END OF SECTION 020010

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SECTION 025130 - GENERAL CONCRETE SURFACE PREPARATION

PART 1 - GENERAL

1.1 DEFINITIONS

- A. **DELAMINATIONS:** Fracture planes, "internal cracks," within concrete. Typically these fractures are parallel to the member face and vary in depth.
- B. **NEAR-VERTICAL CHIPPED EDGES:** Provide an edge dressed to within 20° of perpendicular of finished surface.
- C. **SPALLS:** Potholes, cavities or voids in floor slabs, beams, columns, and walls. Usually result of delamination migrating to face of concrete member. When fracture finally reaches surface, concrete encompassed by delamination breaks away, resulting in spall.
- D. **UN SOUND CONCRETE:** Concrete exhibiting one or more of:
 - 1. Incipient fractures present beneath existing delaminated or spalled surfaces.
 - 2. Honeycombing.
 - 3. Friable or punky areas.
 - 4. Deterioration from freeze-thaw action.
- E. **SCALING:** Deterioration which attacks mortar fraction (paste) of concrete mix. First appears as minor flaking and disintegration of concrete surface. Scaling eventually progresses deeper into concrete, exposing aggregate which breaks away. Concrete scaling is caused by freeze-thaw action. If concrete is frozen in saturated state, excess water freezing in concrete causes high internal stresses.
- F. **SHOTBLASTING:** Scarification of concrete surfaces using an abraded metal shot-rebound. See Corps of Engineer's Manual EM 1110-2-2002 and the National Cooperative Highway Research Program's Report #99 for a more detailed definition.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION 025130

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SECTION 025150 - SURFACE PREPARATION FOR OVERLAY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions in Division 01 Specification Sections apply to this Section.

1.2 SUMMARY

- A. This Section includes the provision of all labor, materials, and equipment necessary to remove all unsound and delaminated concrete, existing failed patches and prepare exposed surfaces created by removal to receive an overlay.
- B. Related Sections: Following Sections contain requirements that relate to this Section:
 - 1. Division 03 Section "Cast-in-Place Concrete."
 - 2. Division 03 Section "Low Slump Dense Concrete."
 - 3. Division 03 Section "Latex Modified Concrete and Mortar."

1.3 REFERENCES

- A. "Specifications for Structural Concrete for Buildings" (ACI 301) by the American Concrete Institute, herein referred to as ACI 301, is included in total as specification for this structure except as otherwise specified herein.
- B. Comply with provisions of following codes, specifications and standards except where more stringent requirements are shown on Drawings or specified herein:
- C. "Guide for Repair of Concrete Bridge Superstructures" (ACI 546.1), American Concrete Institute.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 INSPECTION

- A. Floors
 - 1. Contractor: locate floor slab delaminations by visual examination and sounding surface with hammer, rod or chain drag. When delaminated area is struck, distinct hollow sound is heard.
 - 2. Contractor: sound all designated floors for delaminations.
 - 3. Delaminated areas located by Contractor will be further sounded to define their limits. Mark these limits with chalk or paint.
- B. Contractor: locate spalls by visual inspection and mark their boundaries with chalk or paint after sounding surface.
- C. Engineer/Architect will define and mark additional unsound concrete areas for removal, if required.
- D. Boundaries of overlay areas will be as defined in project drawings and verified by Engineer/Architect.
- E. Contractor shall locate all embedded POST-TENSIONING TENDONS, REINFORCEMENT, AND ELECTRICAL CONDUIT in repair area and mark their locations for reference during concrete removal. Do NOT nick or cut any embeds unless approved by Engineer/Architect.

3.2 CONCRETE REMOVAL AND FLOOR SLAB SURFACE PREPARATION

- A. Temporary shoring may be required at concrete floor repair areas exceeding 5 sq ft and at any column repair. Contractor: review all marked removal and preparation areas and request clarification by Engineer/Architect of shoring requirement in questionable areas. Shores shall be in place prior to concrete removal and cavity preparation in any area requiring shores.
- B. All concrete within marked boundaries of individual delaminated, spalled or unsound concrete areas shall be removed to minimum depth of 0.75 in. using 15 to 30 lb chipping hammers equipped with chisel point bits. When directed by Engineer/Architect, chipping hammers less than 15 lb shall be used to minimize damage to sound concrete. Near-vertical chipped edge shall be provided along perimeter of repair area where shown in Drawings. Areas to be removed shall encompass repair and provide uniform cavity surface. If delaminations exist beyond minimum removal depth, chipping shall continue until all unsound and delaminated concrete has been removed from cavity.
- C. Sixty lb hammers may be used by designated operators. Engineer/Architect shall designate individual operators based on satisfactory execution of removals without unnecessary damage to existing deck. Engineer/Architect will rescind approval of any

or all designated operators if proper care in removals is not maintained and unnecessary damage to deck occurs.

- D. Where embedded reinforcement or electrical conduit is exposed by concrete removal, exercise extra caution to avoid damaging it during removal of unsound concrete. If bond between exposed embedded reinforcement and adjacent concrete is impaired by Contractor's removal operations, Contractor shall perform additional removal around and beyond perimeter of reinforcement for minimum of 0.75 in. along entire length affected at no cost to Owner.
- E. If rust is present on embedded reinforcement where it enters sound concrete, then additional removal of concrete along and beneath reinforcement required. Additional removal shall continue until bare reinforcement is exposed, or may be terminated as Engineer/Architect directs.
- F. Boundaries of overlay area as verified by Engineer/Architect shall be sawcut to depth of 0.75 in. into floor slab unless otherwise noted. No sawcutting required at boundaries abutting existing vertical surface (wall, beam, curb, etc.). Diamond blade saw acceptable. Edge cut at overlay boundary shall be dressed perpendicular to floor slab surface and shall be of uniform depth for entire length of cut. Extra caution shall be exercised during sawcutting operations to avoid damaging existing reinforcement (ESPECIALLY POST-TENSIONING TENDONS AND SHEATHING) near surface of floor slab. Any damage to existing reinforcement, post-tensioning tendons or sheaths during removals shall be repaired by Contractor with Engineer/Architect approved methods at no cost to Owner.
- G. All surfaces to receive overlay that are not delaminated shall be scarified or scabbled and sandblasted prior to overlay placement.

3.3 INSPECTION OF REPAIR PREPARATION

- A. After removals are complete but prior to final cleaning, exposed concrete surfaces and reinforcement shall be inspected by Contractor and verified by Engineer/Architect for compliance with requirements of this Section. Where Engineer/Architect finds unsatisfactory surface preparation, Engineer/Architect will direct Contractor to perform additional removals. Engineer/Architect will re-verify areas after additional removals.
- B. Contractor shall inspect embedded reinforcement and conduits exposed within cavity for defects due to corrosion or damage resulting from removal operations. Contractor shall notify Engineer/Architect of all defective and damaged reinforcement or conduits. Replacement of defective or damaged reinforcement or conduits shall be performed according to this Section and as directed by Engineer/Architect.
- C. After inspections of exposed surfaces and reinforcement are complete, Engineer/Architect and Contractor shall measure and document removal and replacement quantities for payment.

3.4 REINFORCEMENT AND EMBEDDED MATERIALS IN REPAIR AREAS

- A. All embedded reinforcement exposed during surface preparation that has lost more than **XX%** (**XX%** if 2 or more consecutive parallel bars and/or tendons are affected) of original cross-section due to corrosion shall be considered DEFECTIVE. All non-defective exposed reinforcement that has lost section to extent specified above as a direct result of Contractor's removal operations shall be considered DAMAGED.
- B. Embedded materials including, but not limited to, electrical conduit, corrosion protection systems and snow/ice melting equipment shall be protected by Contractor during removal operations. Damage due to removal operations shall be repaired by Contractor in accordance with national code requirements at no cost to Owner. Embedded materials which are defective due to pre-existing conditions may be repaired or replaced by Contractor or abandoned at Owner's option and cost.
- C. Supplement defective or damaged embedded reinforcement by addition of reinforcement of equal diameter with Class "B" minimum splice per ACI 318 beyond damaged portion of reinforcement. Secure new reinforcement to existing reinforcement with wire ties and/or approved anchors. Supplemental reinforcement shall be ASTM A615 Grade 60 steel installed in accordance with Section "Cast-in-Place Concrete." Tendon supplement or repair material, when applicable, shall be as required by Section "Work Items."
- D. Loose reinforcement exposed during surface preparation shall be securely anchored prior to patch placement. Loose reinforcement shall be adequately secured by wire ties to bonded reinforcement or shall have drilled-in anchors installed to original deck. Drilled-in anchors shall be Hilti HKT 14 "Kwik Tie" anchors, ITW Ramset/Red Head WT-1400 anchors, or approved equivalent. Engineer/Architect will determine adequacy of wire ties and approve other anchoring devices prior to their use. Securing loose reinforcement is incidental to surface preparation and no extras will be allowed for this Work.
- E. Concrete shall be removed to provide minimum of 0.75 in. clearance on all sides of defective or damaged exposed embedded reinforcement that is left in place. Minimum of 1.5 in. concrete cover shall be provided over all new and existing floor reinforcement. Cover over reinforcement may be reduced to 1 in. with Engineer/Architect's approval if reinforcement is coated with an approved epoxy resin.
- F. Supplemental reinforcement and concrete removals required for repairs of defective or damaged reinforcement shall be paid for as follows:
 - 1. Concrete removals and supplemental reinforcement required for repairs of DEFECTIVE reinforcement shall be paid for by Owner at unit price bid.
 - 2. Concrete removals and supplemental reinforcement required for repairs of DAMAGED reinforcement shall be paid for by Contractor.

3.5 CLEANING OF REINFORCEMENT WITHIN DELAMINATION AND SPALL CAVITIES

- A. All exposed steel shall be cleaned of rust and laitance to bare metal by sandblasting. Cleaning shall be completed immediately before overlay placement to insure that base metal is not exposed to elements and further rusting for extended periods of time.

- B. Paint exposed steel which has been sandblasted 18 in. from edge of cavity with an approved epoxy and protect from damage prior to and during overlay placement.

3.6 FINAL PREPARATION OF SURFACES FOR OVERLAY PLACEMENT

- A. Floor slab and cavity surfaces will be examined by Engineer/Architect prior to overlay placement. Where Engineer/Architect finds unsatisfactory surface preparation, Engineer/Architect will direct Contractor to perform additional work to obtain satisfactory surface preparation.
- B. Contractor shall sandblast all exposed surfaces to remove laitance and any foreign material that may impair overlay bonding. Airblasting shall be required as final step to remove sand. All debris shall be removed from site prior to overlay placement.

END OF SECTION 025150

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SECTION 033750 - LATEX MODIFIED CONCRETE AND MORTAR

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections apply to this Section.

1.2 SUMMARY

- A. This Section includes the provision of all labor, materials, and equipment necessary for production and installation of latex modified concrete or mortar for overlay of scaled concrete only.
- B. Related Sections: Following Sections contain requirements that relate to this Section:
 - 1. Division 01 Section "Submittal Procedures."
 - 2. Division 02 Section "Work Items."
 - 3. Division 02 Section "General Concrete Surface Preparation."
 - 4. Division 02 Section "Surface Preparation for Patching."
 - 5. Division 07 Section "Concrete Joint Sealants".
 - 6. Division 09 Section "Pavement Marking."

1.3 QUALITY ASSURANCE

- A. Work shall conform to requirements of ACI 301 and ACI 318 except where more stringent requirements are shown on Drawings or specified in this Section.
- B. Testing Agency:
 - 1. Independent testing laboratory employed by Owner and acceptable to Engineer/Architect.
 - 2. Accredited by AASHTO under ASTM C1077. Testing laboratory shall submit documented proof of ability to perform required tests.
- C. Sampling and testing of concrete and mortar shall be performed by ACI certified Concrete Field Technicians Grade I. Certification shall be no more than 3 years old.
- D. Testing Agency is responsible for conducting, monitoring and reporting results of all tests required under this Section. Testing Agency has authority to reject concrete or mortar not meeting Specifications.
- E. Proportioning, production, placement and finishing of latex modified concrete or mortar shall be overseen by, and have approval of, latex manufacturer. Latex admixture supplier shall make available qualified individual experienced in placement of latex

modified concrete overlays, to aid Contractor during placement of all latex modified concrete overlay. Qualification of supplier's representative shall be acceptable to Engineer/Architect.

F. Testing Agency shall submit following information for field testing of concrete unless modified in writing by Engineer/Architect:

1. Project name and location.
2. Contractor's name.
3. Testing Agency's name, address and phone number.
4. Concrete supplier.
5. Date of report.
6. Testing Agency technician's name (sampling and testing).
7. Placement location within structure.
8. Concrete mix data (quantity and type):
 - a. Cement.
 - b. Fine aggregates.
 - c. Coarse aggregates.
 - d. Water.
 - e. Water/cement ratio.
 - f. Latex emulsion.
 - g. Latex emulsion per cu yd of concrete.
 - h. Other admixtures.
9. Weather data:
 - a. Air temperatures.
 - b. Weather.
 - c. Wind speed.
10. Field test data:
 - a. Date, time and place of test.
 - b. Slump.
 - c. Air content.
 - d. Unit weight.
 - e. Concrete temperature.
11. Compressive test data:
 - a. Cylinder number.
 - b. Age of concrete when tested.
 - c. Date and time of cylinder test.
 - d. Curing time (field and lab).
 - e. Compressive strength.
 - f. Type of break.

1.4 REFERENCES

A. American Concrete Institute (ACI):

1. ACI 214, "Recommended Practice for Evaluation of Strength Test Results of Concrete."
2. ACI 301, "Standard Specifications for Structural Concrete."
3. ACI 302.1R, "Guide for Concrete Floor and Slab Construction."
4. ACI 305R, "Hot Weather Concreting."
5. ACI 306R, "Cold Weather Concreting."
6. ACI 306.1, "Standard Specification for Cold Weather Concreting."
7. ACI 318, "Building Code Requirements for Reinforced Concrete."
8. ACI 347, "Recommended Practice for Concrete Formwork."

B. American Society for Testing and Materials (ASTM):

1. ASTM C31, "Method of Making and Curing Concrete Test Specimens in the Field."
2. ASTM C33, "Specification for Concrete Aggregates."
3. ASTM C39, "Test Method for Compressive Strength of Cylindrical Concrete Specimens."
4. ASTM C94, "Specification for Ready-Mixed Concrete."
5. ASTM C109, "Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or 50-mm Cube Specimens)."
6. ASTM C138, "Test Method for Unit Weight, Yield, and Air Content (Gravimetric) of Concrete."
7. ASTM C143, "Test Method for Slump of Portland Cement Concrete."
8. ASTM C150, "Specification for Portland Cement."
9. ASTM C172, "Method of Sampling Freshly Mixed Concrete."
10. ASTM C173, "Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method."
11. ASTM C231, "Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method."
12. ASTM C260, "Specification for Air-Entraining Admixtures for Concrete."
13. ASTM C494, "Specification for Chemical Admixtures for Concrete."
14. ASTM C685, "Specification for Concrete Made by Volumetric Batching and Continuous Mixing."
15. ASTM C1040, "Standard Test Method for Density of Unhardened and Hardened Concrete by Nuclear Methods."
16. ASTM C1077, "Standard Practice for Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation."
17. ASTM C1218, "Sampling and Testing for Water Soluble Chloride Ion in Concrete and Concrete Raw Materials."

C. Concrete Reinforcing Steel Institute (CRSI):

1. CRSI MSP, "Manual of Standard Practice."

D. Contractor shall have following ACI publications at Project construction site:

1. ACI SP-15, "Standard Specifications for Structural Concrete ACI 301 with selected ACI and ASTM References."

2. ACI 302.1R, "Guide for Concrete Floor and Slab Construction."
3. ACI 305R, "Hot Weather Concreting."
4. ACI 306R, "Cold Weather Concreting."
5. ACI 306.1, "Standard Specification for Cold Weather Concreting."

1.5 SUBMITTALS

- A. Make submittals in accordance with requirements of Division 01 of this Specification, and as herein specified.
- B. Contractor shall submit concrete mix design reviewed and approved by latex manufacturer to Engineer/Architect 2 weeks prior to placing concrete. Use mix design submittal form included at end of this Section. Proportion mix designs as defined in ACI 301, 4.2.3. Include following information for each concrete mix design:
 1. Method used to determine proposed mix design (per ACI 301, 4.2.3).
 2. Gradation of fine and coarse aggregates: ASTM C33.
 3. Proportions of all ingredients including all admixtures added either at time of batching or at job site.
 4. Water-cement ratio.
 5. Slump: ASTM C143.
 6. Certification of chloride content of admixtures.
 7. Air content of freshly mixed concrete by pressure method, ASTM C231.
 8. Unit weight of concrete: ASTM C138.
 9. Strength at 3 and 28 days.
 10. Water soluble chloride ion content of concrete per ASTM C1218.
- C. Contractor: At pre-concrete meeting, submit procedures to protect fresh concrete from rain and hot and cold weather conditions.
- D. Testing Agency: Promptly report all concrete test results to Engineer/Architect, Contractor and concrete supplier. Include following information:
 1. See Article "Quality Assurance," paragraph "Testing Agency shall submit...."
 2. Weight of concrete, ASTM C138.
 3. Slump, ASTM C143.
 4. Air content of freshly mixed concrete by pressure method, ASTM C231 or volumetric method, ASTM C173.
 5. Concrete temperature (at placement time).
 6. Air temperature (at placement time).
 7. Strength determined in accordance with ASTM C39.
- E. Concrete batched on-site shall be placed and finished within 30 minutes of adding water to mixture.
- F. See requirements of Division 01 Section, "Submittal Procedures," Part 1 heading, "Submittal Procedures," for limits to resubmittals.

- G. See requirements of Division 01 Section, "Submittal Procedures," Part 2 heading, "Requests for Information," for RFI constraints.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Aggregates (ACI 301, Article 4.2.1):
1. Normal weight concrete aggregates:
 - a. Coarse aggregate: Crushed and graded limestone or approved equivalent conforming to ASTM C33, Class Designation 5S.
 - b. Fine aggregate: Natural sand conforming to ASTM C33 and having preferred grading shown for normal weight aggregate in ACI 302.1R, Table 4.2.1.
 2. Coarse aggregate: Nominal sizes indicated below, conforming to ASTM C33, Table 2:
 - a. 0.375 in. for patch cavities 0.75 to 1.5 in. deep.
 - b. 0.5 in. for patch cavities greater than 1.5 in. deep and overlay work. For overlays limit maximum size of aggregates to one-third nominal thickness of overlay.
 3. Chloride Ion Level: Chloride ion content of aggregates shall be tested by laboratory making trial mixes. Also, total water soluble chloride ion content of mix including all constituents shall not exceed 0.06% chloride ions by weight of cement for prestressed concrete, and 0.15% chloride ions by weight of cement for reinforced concrete. Test to determine chloride ion content shall conform to Test Method ASTM C1218.
- B. Cement (ACI 301, 4.2.1.1):
1. Portland cement, Type I, ASTM C150. Use 1 cement clinker source throughout project. No change in brand without prior written approval from Engineer/Architect.
- C. Water (ACI 301, 4.2.1.3):
1. ASTM C94.
- D. Latex Emulsion:
1. "Dow Reichhold Modifier A/NA, Dow Reichhold Specialty Latex LLC, Research Triangle Park, N.C.
 2. "Styrofan 1186," BASF Corporation, Chattanooga, TN.
 3. Or Engineer approved equal submitted prior to bidding.

E. Admixtures (ACI 301, 4.2.1.4):

1. Only admixtures listed shall be acceptable. Do not submit alternates.
2. Concrete supplier and manufacturer shall certify compatibility of all ingredients in each mix design.
3. Use admixtures in strict accordance with manufacturer's recommendations.
4. Prohibited Admixtures: Calcium chloride, thiocyanates or admixtures containing more than 0.5% chloride ions, by weight of admixture, are not permitted. Additionally, each admixture shall not contribute more than 5 ppm, by weight, of chloride ions to total concrete constituents.

F. Storage of Materials (ACI 301, 4.1.4).

2.2 CONCRETE MIX DESIGN

- A. Selection of concrete proportions shall be in accordance with ACI 301, 4.2.3.1. Before any concrete is placed for project, Contractor shall submit to Engineer/Architect data showing method used for determining proposed concrete mix design, including fine and coarse aggregate gradations, proportions of all ingredients, water-cement ratio, slump, air content, cylinder breaks and other required data specified in Article "Submittals," second para, for each different concrete type specified. Mix design shall meet following minimum requirements:

Compressive Strength	4500 psi @ 28 days (2500 psi @ 3 days)
Water-Cement Ratio	0.25 to 0.40
Latex Content Per Sack of Cement	3.5 gal.
Slump*	4 in. ± 2 in.
Cement Content	658-800 lb./c.y.
Air Content	Less than 6.5%

*For concrete placed by vibratory screeds, slump shall not exceed 4 in. at point of deposit.

- B. Chloride Ion Level: See Article "Materials," paragraph "Chloride Ion Level."
- C. Bonding Grout: Bonding grout shall consist of sand, cement, and latex emulsion in proportions similar to mortar in concrete with sufficient water to form stiff slurry to achieve consistency of "pancake batter."

PART 3 - EXECUTION

3.1 PRODUCTION OF MORTAR OR CONCRETE

- A. Production of latex modified mortar or concrete shall be in accordance with requirements of ACI 301, 4.3.1, except as otherwise specified herein.

- B. Concrete or mortar, mixed at site, shall be proportioned by continuous mixer used in conjunction with volumetric proportioning. Volumetric batching/continuous mixers shall conform to ASTM C685. In addition, self-contained, mobile, continuous type mixing equipment shall comply with following:
1. Mixer shall be capable of producing batches of not less than 6 cu yds.
 2. Mixer shall be capable of positive measurement of cement being introduced into mix. Recording meter visible at all times and equipped with ticket printout shall indicate this quantity.
 3. Mixer shall provide positive control of flow of water into mixing chamber. Water flow shall be indicated by flowmeter and shall be readily adjustable to provide for minor variations in aggregate moisture.
 4. Mixer shall be capable of being calibrated to automatically proportion and blend all components of indicated composition on continuous or intermittent basis, as required by finishing operation, and shall discharge mixed material through conventional chute into transporting device or directly in front of finishing machine. Sufficient mixing capacity of mixers shall be provided to permit intended pour to be placed without interruption.
 5. Mixer shall be calibrated to accurately proportion specified mix. Yield is required to be within tolerance of 1.0 %.
- C. On-site mortar or concrete batching in mixer of at least 0.125 cu yd capacity shall be permitted only with approval of Engineer/Architect. On-site concrete batching and mixing shall comply with requirements of ACI 301, 4.3.1.

3.2 PREPARATION (ACI 301, 5.3.1)

- A. Cavity surfaces shall be clean and dry prior to commencement of patch or overlay installation. Preparation of surfaces to receive new concrete shall be in accordance with Section "Surface Preparation for Patching" and/or "Surface Preparation for Overlay."
- B. Bonding Grout:
1. Bonding grout shall be applied to damp (but not saturated) concrete surface in uniform thickness of 0.0625 in. to 0.125 in. over all surfaces to receive patching or overlay.
 2. Grout shall not be allowed to dry or dust prior to placement of patch or overlay material. If concrete placement is delayed and the coating dries, cavity or surface shall not be patched or overlaid until it has been recleaned and prepared as specified in Section "Surface Preparation for Patching" or "Surface Preparation for Overlay." Grout shall not be applied to more area than can be patched or overlaid within 0.5 hr by available manpower.
- C. Receive Owner's and Engineer/Architect's written approval of concrete surface finish used on flatwork before beginning of construction.

3.3 INSTALLATION

A. Placing (ACI 301, 5.3.2):

1. Do not place concrete when temperature of surrounding patch area or air is less than 50° F. unless following conditions are met:
 - a. Place concrete only when temperature of surrounding air is expected to be above 45° F. for at least 36 hours.
 - b. When above conditions are not met, concrete may be placed only if insulation or heating enclosures are provided in accordance with ACI 306, "Recommended Practice for Cold Weather Concreting." Submit proposed protective measures in writing for Engineer/Architect's review prior to concrete placement.
 - c. Cost for precautionary measures required shall be borne by Contractor.
2. Concrete shall be manipulated and struck off slightly above final grade. Concrete shall then be consolidated and finished to final grade with internal and surface vibration devices. Proposed consolidation method shall be submitted for Engineer/Architect's review prior to concrete placement.
 - a. Do not place concrete if mix temperature exceeds 85° F.
 - b. Do not place concrete under hot weather conditions. Hot weather is defined as air temperature which exceeds 80° F. or any combination of high temperature, low humidity and high wind velocity which causes evaporation rates in excess of 0.10 psf per hr as determined by ACI 305R, Figure 2.1.5.
3. Fresh concrete 3 in. or more in thickness shall be vibrated internally in addition to surface vibration.
4. Concrete shall be deposited as close to its final position as possible. All concrete shall be placed in continuous operation and terminated only at bulkheads or designated control or construction joints.
5. On ramps with greater than 5 % slope, all concreting shall begin at low point and end at high point. Contractor shall make any necessary adjustment to slump or equipment to provide wearing surface without any irregularities or roughness.

B. Finishing (ACI 301, 5.3):

1. Flatwork (BROOM Finish, 5.3.4.2.d):
 - a. When tight and uniform concrete surface has been achieved by screeding and finishing operation, give slab surface coarse transverse scored texture by drawing broom across surface. Texture shall be accepted by Owner and Engineer/Architect from sample panels.
 - b. Finishing tolerance: ACI 301, 5.3.4.2; Class B tolerance.
 - c. Finish all concrete surfaces to proper elevations to insure that all surface moisture will drain freely to floor drains, and that no puddle areas exist. Contractor shall bear cost of any corrections to provide for positive drainage.

C. Curing:

1. Latex modified mortar and concrete shall be cured according to latex manufacturer's recommendations and according to following minimum requirements:
 - a. Surface shall be covered with single layer of clean, wet burlap as soon as surface will support it without deformation. Cover burlap with continuous single thickness of polyethylene film for 24 hours.
 - b. After 24 hours remove polyethylene film and allow burlap to dry slowly for an additional 24 to 48 hours.
 - c. Remove burlap and allow concrete to air dry for an additional 48 hours.
 - d. Curing time shall be extended, as Engineer/Architect directs, when curing temperature falls below 50° F.

D. Repair of Defects (ACI 301, 5.3.7):

1. Repair all surface defects exceeding 0.25 in. width or depth.
2. Match color of concrete to be repaired.
3. Submit samples of materials and relevant literature and test data on proprietary compounds and procedures used for adhesion or patching ingredients to Engineer/Architect for its review before patching concrete.
4. Receive written approval of Engineer/Architect of method and materials prior to making repairs to concrete.

3.4 FIELD QUALITY CONTROL BY TESTING AGENCY (ACI 301, 1.6)

A. Air Content:

1. Sample freshly-mixed concrete per ASTM C172 and conduct 1 air content test per ASTM C231 or ASTM C173 for each 10 cu yds of concrete placed or each day's production, whichever is less.

B. Concrete Compressive Strength:

1. Mold test cylinders in accordance with ASTM C31 and test in accordance with ASTM C31 as follows:
 - a. Take minimum of 6 cylinders for each 25 cu yds or fraction thereof, of each mix design of concrete placed in any 1 day. Use of 4 in. x 8 in. cylinders in lieu of standard cylinders is acceptable.
 - b. Additional 2 cylinders shall be taken and field cured under conditions of cold weather concreting, and when directed by Engineer/Architect.
2. Cover specimens properly, immediately after finishing. Protect outside surfaces of cardboard molds, if used, from contact with sources of water for first 24 hours after molding.
3. Fabricate and cure test cylinders per ASTM C31, except as follows:
 - a. To verify compressive strength, test cylinders required due to cold weather concreting conditions:

- 1) Store test specimens on structure as near to point of sampling as possible and protect from elements in same manner as that given to portion of structure as specimen represents.
 - 2) Transport to test laboratory no more than 4 hours before testing. Remove molds from specimens immediately before testing.
 - b. To verify 28-day compressive strength:
 - 1) During first 24 hours after molding, store test specimens under conditions that maintain temperature immediately adjacent to specimens in range of 60 to 80° F. and prevent loss of moisture from specimens.
 - 2) Remove test specimens from molds at end of 20 ± 4 hours and store at $73 \pm 3^\circ$ F., $50 \pm 4\%$ relative humidity in laboratory until moment of test.
 4. Compression tests:
 - a. Test 2 cylinders at 3 days.
 - b. Test 2 cylinders at 28 days.
 - c. Hold 2 cylinders in reserve for use as Engineer/Architect directs.
 5. Unless notified by Engineer/Architect, reserve cylinders may be discarded without being tested after 56 days.
- C. Slump Test:
1. Conduct 1 slump test in accordance with ASTM C143 for each 10 yards of concrete placed, or each day's production, whichever is less.
- D. Yield and Proportioning Tests (ASTM C685):
1. When concrete placements involve more than 100 cu yds, accuracy of on-site batching equipment output indicators shall be verified at 50 cu yd intervals.
 2. Accuracy of on-site batching equipment proportioning of concrete mixture shall be verified at 100 cu yd intervals.
- E. Evaluation and Acceptance of Concrete (ACI 301, 1.6.7 and ACI 318, 4.7):
1. Concrete compression tests will be evaluated by Engineer/Architect in accordance with ACI 301, 1.6.7. If number of tests conducted is inadequate for evaluation of concrete or test results for any type of concrete fail to meet specified strength requirements, core tests may be required as directed by Engineer/Architect.
 2. Core tests, when required, per ACI 301, 1.6.7.3.
 3. Should tested hardened concrete meet these specifications, Owner will pay for coring and testing of hardened concrete. Should tested hardened concrete not meet these specifications, concrete contractor will pay for coring and testing of hardened concrete and for any corrective action required for unaccepted concrete.

F. Acceptance of Structure (ACI 301,1.7):

1. Acceptance of completed concrete Work will be according to provisions of ACI 301, 1.7.
2. Patched and overlaid areas shall be sounded by Contractor with chain drag after curing for 7 days. Contractor shall repair all hollowness detected by removing and replacing patch or affected area at no extra cost to Owner.
3. If shrinkage cracks appear in overlay when initial 24 hours curing period is completed, overlay shall be considered defective, and it shall be removed and replaced by Contractor at no extra cost.

END OF SECTION 033750

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**MIX DESIGN SUBMITTAL FORM
LATEX MODIFIED CONCRETE**

(Submit separate form for each mix design)

I. GENERAL INFORMATION	
Project:	City:
General Contractor:	
Mix Design Identification No.:	
Use (Describe) ⁽¹⁾ :	

⁽¹⁾ Overlay, Floor Patching, Beam Repairs, etc.

II. MIX DESIGN PREPARATION:		
Mix Design Based on (Check one):	Standard Deviation Analysis: or	Trial Mix Test Data:
Design Characteris- tics:	Density: _____ pcf;	Air: _____ %
	Strength: _____ psi (28 day);	Slump _____ in.

Latex Manufacturer Approval

Name: _____

Title: _____

Date: _____

WALKER ACCEPTANCE STAMP

III. MATERIALS:		
Aggregates: (size; type; source; gradation report; specification)		
Coarse:		
Fine:		
Other Materials:	Type	Product-Manufacturer (Source)
Cement:		
Latex Admixture:		
Other(s):		

IV. MIX PROPORTIONS (per yd ³)		
	WEIGHT (lbs.)	ABSOLUTE VOL. (cu. ft.)
Cement:		
Fine Aggregate: ⁽¹⁾		
Coarse Aggregate: ⁽¹⁾		
Latex: ⁽²⁾		
Water: ⁽³⁾		
Other(s):		
TOTALS:		
NOTES: ⁽¹⁾ Based on saturated surface dry weights of aggregates. ⁽²⁾ Include only weight of solids portion of latex admixture. Confirm with manufacturer actual percentages of solids and water in suspension and coordinate with Note 3. ⁽³⁾ Includes ALL WATER , including added water, free water contained on aggregates, and <u>water suspension portion of latex admixture.</u>		

V. RATIOS	
Water ⁽⁴⁾ =	_____ lb.
Cement	_____ lb.
Fine Agg. =	_____ lb.
Total Agg	_____ lb.

VI. SPECIFIC GRAVITIES
Fine Aggregate
Coarse Aggregate

VII. ADMIXTURES		
Air Entraining Agent (A.E.A.):	_____ oz.	per 100# cement
Water Reducer	_____ oz.	per 100# cement
Latex Emulsion	_____ gal	per sack cement
Other(s)		

VIII. <u>STANDARD DEVIATION ANALYSIS:</u>	<u>Yes</u>	<u>N/A</u>
<u>(Complete this section only if mix design was developed using standard deviation analysis of previous project test results. If other method was used, check "N/A".)</u>		
<u>Number of Test Cylinders Evaluated:</u>	<u>Standard Deviation:</u>	
Mix Designs Proportioned to Achieve $f'_{cr} = f'_c + \underline{\hspace{2cm}}$ psi		
<p>NOTE:</p> <p>Mix designs shall be proportioned to achieve f'_{cr} equal to or greater than the larger of $f'_{cr} = f'_c + 1.34s$ [s= calculated standard deviation] or $f'_{cr} = f'_c + 2.33s - 500$ (Refer to ACI 301 for increased deviation factor when less than 30 tests are available.)</p>		

IX. <u>TRIAL MIXTURE TEST DATA:</u>		<u>Yes</u>	<u>N/A</u>
(Complete this section only if mix design is based on data from trial test mixture(s) batched by testing agency or Contractor. If other method was used, check "N/A".)			
<u>Age</u> (days)	<u>Trial Mix #1</u> (comp. str.)	<u>Trial Mix #2</u> (comp. str.)	<u>Trial Mix #3</u> (comp. str.)
<u>7</u>			
<u>7</u>			
<u>28</u>			
<u>28</u>			
28 day average compressive strength: _____ psi			
DESIGN MIX CHARACTERISTICS			
Slump = _____ in.		Air Content = _____ %	
Unit Wet Wt. = _____ pcf		Unit Dry Wt. = _____ pcf	
Mix Design Proportioned to Achieve: f'c + 1200 psi (1200 psi increases to 1400 psi when f'c > 5000 psi)			
ACTUAL MIX CHARACTERISTICS			
Initial Slump = _____ in.		Final Slump _____ in.	
Unit Wet Wt.= _____ pcf.		Unit Dry Wt. = _____ pcf	
Air Content = _____ %			

X. OTHER REQUIRED TESTS

Soluble Chloride Ion Content of mix: _____ % by weight of cement
(Water soluble by ASTM 1218 OR AASHTO T260)

XI. Remarks:

Submitted by:

Latex Modified Concrete Supplier

Name:

Address:

Phone Number:

Date:

My signature below certifies that I have read, understood, and will comply with the requirements of this Section.

Signature_____

Typed or Printed Name _____

REQUIRED ATTACHMENTS	
	Coarse aggregate grading report
	Fine aggregate grading report
	Concrete compressive strength data used for standard deviation calculations
	Chloride ion data and related calculations
	Admixture compatibility certification letter

INSTRUCTIONS:

1. Fill in all blank spaces. Use -0- (Zero) or N.A. (Not Applicable) where appropriate. See "Design and Control of Concrete Mixtures: 13th Edition by Portland Cement Association, for assistance in completing this form.
2. Provide the necessary documentation to support any laboratory test results or compliance to standard ASTM test methods or specifications referenced in the mix design submittal form.
3. If mix design utilizes multiple aggregate material sources, submit chloride ion content test data of each component from material suppliers. Test data shall be not more than 1 yr old.

Attach letter of certification that all admixtures, including latex admixture, are compatible for this mix design.

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SECTION 033760 - TROWEL APPLIED MORTAR

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections apply to this Section.

1.2 SUMMARY

- A. This Section includes the provision of all labor, materials, supervision and incidentals necessary to prepare deteriorated or damaged concrete surfaces and install patches to overhead and vertical surfaces to restore original surface condition and integrity.
- B. Related Sections: Following Sections contain requirements that relate to this Section:
 - 1. Division 01 Section "Submittal Procedures."
 - 2. Division 02 Section "Work Items."
 - 3. Division 02 Section "General Concrete Surface Preparation."
 - 4. Division 02 Section "Surface Preparation for Patching."
 - 5. Division 03 Section "Cast in Place Repair Mortar."
 - 6. Division 03 Section "Epoxy Injection Systems."

1.3 REFERENCES

- A. "Standard Specification for Structural Concrete" (ACI 301) by American Concrete Institute, herein referred to as ACI 301, is included in total as specification for this structure except as otherwise specified herein.
- B. Comply with provisions of following codes, specifications and standards except where more stringent requirements are shown on Drawings or specified herein:
 - 1. "Building Code Requirements for Structural Concrete" (ACI 318), American Concrete Institute, herein referred to as ACI 318.
 - 2. "Hot Weather Concreting" reported by ACI Committee 305.
 - 3. "Cold Weather Concreting" reported by ACI Committee 306.
 - 4. "Standard Specification for Curing Concrete" (ACI 308)
- C. Contractor shall have following ACI publications at Project construction site at all times:
 - 1. "Standard Specifications for Structural Concrete (ACI 301) with Selected ACI and ASTM References," ACI Field Reference Manual, SP15.
 - 2. "Hot Weather Concreting" reported by ACI Committee 305.

3. "Cold Weather Concreting" reported by ACI Committee 306.
4. "Standard Specification for Curing Concrete" (ACI 308)

D. American Society for Testing and Materials (ASTM):

1. ASTM C109, "Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or 50-mm Cube Specimens)."
2. ASTM C31, "Test Method for Compressive Strength of Cylindrical Concrete Specimens."

1.4 SUBMITTALS

- A. Make submittals in accordance with requirements of Division 01 and as specified in this Section.
- B. Contractor: At pre-construction meeting, submit procedures for demolition, surface preparation, material batching, placement, finishing, and curing of application. Provide procedure to protect fresh patches from severe weather conditions.
- C. Testing Agency: Promptly report all mortar test results to Engineer/Architect and Contractor. Include following information:
 1. See Article "Quality Assurance," paragraph "Testing Agency shall submit...."
 2. Strength determined in accordance with ASTM C109.
- D. See requirements of Division 01 Section, "Submittal Procedures," Part 1 heading, "Submittal Procedures," for limits to resubmittals.
- E. See requirements of Division 01 Section, "Submittal Procedures," Part 2 heading, "Requests for Information," for RFI constraints.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Trowel Applied Repair Mortar: Shall be prepackaged, polymer-modified cementitious repair mortar with integral corrosion inhibitor capable of vertical/overhead application by trowel achieving a minimum 3,000 psi compressive strength at 7 days and 5,000 psi compressive strength at 28 days per ASTM C 109 as certified by manufacturer. Manufacturer to submit volume and size of SSD aggregate used for mix extension.
 1. Acceptable materials for this Work are as follows:
 - a. Polymer modified with Integral corrosion inhibitor

- 1) "MasterEmaco N 300 CI," "MasterEmaco S 488 CI," "MasterEmaco N 425" or "MasterEmaco N 400," by BASF Construction Chemicals, Shakopee, MN.
- 2) "Duraltop Gel" or "Speedcrete PM," by The Euclid Chemical Company, Cleveland, OH.
- 3) "Super-Top OV" by King Packaged Materials Company, Burlington, ON
- 4) "Planitop 23" by MAPEI Corporation, Deerfield Beach, FL

2.2 MATERIAL ACCESSORIES

- A. Extended Open Time Epoxy Bonding Agent: Three component, water based, epoxy modified portland cement bonding agent providing the recommended Manufacturer's open time in which to apply repair mortar. Product shall be capable of achieving bond strength of 2,700 psi per ASTM C 882.

1. Acceptable materials for this Work are:

- a. "Duralprep A.C." by The Euclid Chemical Company, Cleveland, OH.
- b. "Sika Armatec 110 EpoCem", by Sika Corporation, Lyndhurst, NJ.
- c. "PLANIBOND 3C", by MAPEI Corporation, Deerfield Beach, FL.
- d. [Other types may be used only with Engineer/Architect's approval in writing prior to bidding.]

- B. Epoxy Adhesive: 2 or 3 component, 100 percent solids, 100 percent reactive compound suitable for use on dry or damp surfaces. Product shall be capable of achieving bond strength of 1,800 psi per ASTM C 882.

1. Acceptable materials for this Work are:

- a. "MasterEmaco P 124" or "MasterEmaco ADH 326," by BASF Construction Chemicals, Shakopee, MN.
- b. "Euco #452 Epoxy Series," or "Duralcrete Epoxy Series", by The Euclid Chemical Company, Cleveland, OH.
- c. Sikadur 32 Hi-Mod LPL", by Sika Corporation, Lyndhurst, NJ.
- d. "Planibond EBA", by MAPEI Corporation, Deefield Beach, FL.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Surface Preparation: Cavity surfaces shall be clean and dry prior to commencement of patch installation. Preparation of cavity to receive new mortar shall be in accordance with Section "Surface Preparation for Patching" and manufacturer's instructions.

3.2 INSTALLATION

A. Repair Mortar Bonding Grout:

1. Mix and apply bonding grout in strict accordance with manufacturer's recommendations.
2. If bonding grout dries, cavity shall not be patched until it has been recleaned and prepared as specified in Section "Surface Preparation for Patching." Grout shall not be applied to more cavities than can be patched within 0.25 hr by available manpower.

B. Epoxy Bonding Agent Extended Open Time]

1. In strict accordance with manufacturer's recommendations, mix and apply epoxy bonding agent to prior to placing forms in areas to receive form and pour repair mortar].

C. Mortar Placement: Patching materials shall be placed immediately following grout application in strict accordance with manufacturer's instructions. Properly proportioned and mixed patch material shall be placed using trowels to consolidate patch so that no voids exist within new material and continuous contact with base concrete is achieved. Supplemental wire mesh shall be required for delamination and spall repairs greater than two inches in depth. Fresh bonding grout is required between successive lifts of patching material.

3.3 CURING

A. Protect freshly placed concrete repair mortar from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during placement. Keep patch material continually moist prior to final curing by evaporation retarder, misting, sprinkling, or using absorptive mat or fabric covering kept continually moist.

1. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.1 lb/sq. ft. x h before and during finishing operations. Apply material according to manufacturer's written instructions one or more times after placement, but prior to float finishing. Repeated applications are prohibited after float finishing has begun.
2. Acceptable evaporation retarder materials for this Work are:
 - a. "Cimfilm", by Axim Concrete Technologies.
 - b. "MasterKure ER 50", by BASF Construction Chemicals, Shakopee, MN.
 - c. "AquaFilm", by Conspec Marketing & Manufacturing Co., Inc.
 - d. "Sure-Film (J-74)", by Dayton Superior Corporation.
 - e. "Eucobar", or "Tamms Surface Retarder", by The Euclid Chemical Company, Cleveland, OH.

- f. “E-Con”, by L&M Construction Chemicals, Inc.
 - g. “EVRT”, by Russ Tech Admixtures, Inc.
 - h. “SikaFilm”, by Sika Corporation, Lyndhurst, NJ.
- B. Final Curing: Curing compounds complying with ASTM C309 may be used in accordance with recommendations of ACI 506.7, "Specification for Concrete." Provide additional curing immediately following initial curing and before patch material has dried. Use one of following materials or methods:
 - 1. Continue method used in initial curing.
 - 2. Material conforming to ASTM C171.
 - 3. Curing compounds conforming to ASTM C309.
 - 4. Other moisture retaining covering as approved by Engineer/Architect.
 - 5. Duration of Curing: Continue curing for first 7 days after patch placement. During initial and final curing periods maintain patch material above 50° F.
 - 6. Prevent rapid drying at end of curing period.
 - 7. Provide additional curing as required or recommended by manufacturer.
- C. Curing Compound (VOC Compliant, less than 350 g/l): Comply with ASTM C 309, Type 1, Class A or B. Moisture loss shall be not more than 0.55 kg/m² when applied at 200 sq. ft/gal. Manufacturer's certification is required. Silicate based compounds prohibited.
 - 1. Subject to project requirements provide one of the following products:
 - a. “Kurez DR VOX” or “Kurez RC,” or “Kurez RC Off,” Euclid Chemical Company.
 - b. “RxCure WB,” or “RxCure VOC” or “W.B. Cure VOC,” Conspec Marketing & Manufacturing.
 - c. “MasterKure CC 200 WB” or “MasterKure CC 160 WB” BASF Construction Chemicals, LLC.
 - d. “MAPECURE DR”, by MAPEI Corporation, Deerfield Beach, FL.
 - 2. Additional requirements:
 - a. With product submittal provide plan and procedures for removal of residual curing compound prior to application of sealers, coatings, stains, pavement markings and other finishes.
 - b. Provide a summary of testing to show adequate surface preparation for successful application of sealers, coatings, stains, pavement markings, and other finishes.

3.4 EVALUATION AND ACCEPTANCE OF TROWEL APPLIED MORTAR REPAIRS

- A. Acceptance of Repairs (ACI 301):
 - 1. Acceptance of completed concrete Work will be according to provisions of ACI 301.

2. Patched areas shall be sounded by Engineer/Architect and Contractor with hammer or rod after curing for 72 hours. Contractor shall repair all hollowness detected by removing and replacing patch or affected area at no extra cost to Owner.
3. If shrinkage cracks appear in patch area when initial curing period is completed, patch shall be considered defective, and it shall be removed and replaced by Contractor at no extra cost.

END OF SECTION 033760

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SECTION 033761 – CAST IN PLACE REPAIR MORTAR

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections apply to this Section.

1.2 SUMMARY

- A. This Section includes the provision of all labor, materials, supervision and incidentals necessary to prepare deteriorated or damaged concrete surfaces and install concrete repair mortar to formed horizontal, vertical and overhead surfaces to restore original surface condition and integrity.
- B. Related Sections: Following Sections contain requirements that relate to this Section:
 - 1. Division 01 Section "Submittal Procedures."
 - 2. Division 02 Section "Work Items."
 - 3. Division 02 Section "General Concrete Surface Preparation."
 - 4. Division 02 Section "Surface Preparation for Patching."
 - 5. Division 03 Section "Cast in Place Repair Mortar."
 - 6. Division 03 Section "Epoxy Injection Systems."
 - 7. Division 07 Section "Concrete Joint Sealants."
 - 8. Division 07 Section "Expansion Joint Assemblies."
 - 9. Division 07 Section "Water Repellents."
 - 10. Division 07 Section "Traffic Coatings."
 - 11. Division 09 Section "Pavement Marking."

1.3 QUALITY ASSURANCE

- A. Work shall conform to requirements of ACI 301 as applicable except where more stringent requirements are shown on Drawings or specified in this Section.
- B. Testing Agency:
 - 1. Independent testing laboratory employed by Owner and acceptable to Engineer.
 - 2. Accredited by AASHTO under ASTM C1077. Testing laboratory shall submit documented proof of ability to perform required tests.
- C. Sampling and testing of mortar shall be performed by ACI certified Concrete Field Technicians Grade I. Certification shall be no more than three years old.

- D. Testing Agency is responsible for conducting, monitoring and reporting results of all tests required under this Section. Testing Agency has authority to reject mortar not meeting Specifications.
- E. Testing Agency shall submit the following information for Field Testing of Concrete unless modified in writing by Engineer:
 - 1. Project name and location.
 - 2. Contractor's name.
 - 3. Testing Agency's name, address and phone number.
 - 4. Mortar manufacturer.
 - 5. Date of report.
 - 6. Testing Agency technician's name (sampling and testing).
 - 7. Placement location within structure.
 - 8. Weather data:
 - a. Air temperatures.
 - b. Weather.
 - c. Wind speed.
 - 9. Date, time, and place of test.
 - 10. Compressive test data:
 - a. Cube number.
 - b. Age of mortar when tested.
 - c. Date and time of cube test.
 - d. Compressive strength.

1.4 REFERENCES

- A. "Standard Specification for Structural Concrete" (ACI 301) by American Concrete Institute, herein referred to as ACI 301, is included in total as specification for this structure except as otherwise specified herein.
- B. Comply with provisions of following codes, specifications and standards except where more stringent requirements are shown on Drawings or specified herein:
 - 1. "Building Code Requirements for Structural Concrete" (ACI 318), American Concrete Institute, herein referred to as ACI 318.
 - 2. "Hot Weather Concreting" reported by ACI Committee 305.
 - 3. "Cold Weather Concreting" reported by ACI Committee 306.
 - 4. "Standard Specification for Curing Concrete" (ACI 308)
- C. Contractor shall have following ACI publications at Project construction site at all times:
 - 1. "Standard Specifications for Structural Concrete (ACI 301) with Selected ACI and ASTM References," ACI Field Reference Manual, SP15.

2. "Hot Weather Concreting" reported by ACI Committee 305.
 3. "Cold Weather Concreting" reported by ACI Committee 306.
- D. American Society for Testing and Materials (ASTM):
1. ASTM C109, "Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or 50-mm Cube Specimens)."
 2. ASTM C31, "Test Method for Compressive Strength of Cylindrical Concrete Specimens."

1.5 SUBMITTALS

- A. Make submittals in accordance with requirements of Division 01 and as specified in this Section.
- B. Contractor: At preconstruction meeting, submit procedures for demolition, surface preparation, material batching, placement, finishing, and curing of application. Provide procedure to protect fresh patches from severe weather conditions.
- C. Testing Agency: Promptly report all mortar test results to Engineer and Contractor. Include following information:
1. See Article "Quality Assurance," paragraph "Testing Agency shall submit...."
 2. Strength determined in accordance with ASTM C109.
- D. See requirements of Division 01 Section, "Submittal Procedures," Part 1 heading, "Submittal Procedures," for limits to re-submittals.
- E. See requirements of Division 01 Section, "Submittal Procedures," Part 2 heading, "Requests for Information," for RFI constraints.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Horizontal Repair Mortar: Shall be prepackaged, polymer-modified cementitious repair mortar capable of form and pour partial and full depth applications, achieving a minimum 3,000 psi compressive strength at 7 days and 5,000 psi compressive strength at 28 days per ASTM C109 if neat and ASTM C39 if extended as certified by manufacturer.
1. Acceptable materials without corrosion inhibitor for this Work are as follows:
 - a. Polymer Modified or High Early Strength:

- 1) “Sika Repair 222 with Latex R”, by Sika Corporation, Lyndhurst, NJ.
 - 2) “LS-S6 or S10”, or “LM-S6 or S10” by King Packaged Materials Company, Burlington, ON.
 - 3) “TOPCEM PREMIX with PLANITOP AC” by MAPEI Corporation, Deerfield Beach, FL.
- B. Rapid Strength Repair Mortar/Topping: Shall be prepackaged, polymer-modified cementitious repair mortar containing integral corrosion inhibitor. Repair mortar shall be capable of cast-in-place horizontal and vertical form and pour application achieving a minimum 2,500 psi compressive strength at 1 day and 6,500 psi compressive strength at 28 days per ASTM C109 if neat and ASTM C39 if extended as certified by manufacturer with maximum lineal shrinkage of 0.10% at 28 days.
1. Acceptable materials for this Work are as follows:
 - a. Polymer-modified:
 - 1) “Duraltop Flowable Mortar”, by The Euclid Chemical Company, Cleveland, OH.
 - 2) “SikaTop 111 Plus”, or “Sikatop 122 Plus” by Sika Corporation, Lyndhurst, NJ.
 - 3) “Planitop 11” or Planitop 18”, by MAPEI Corporation, Deerfield Beach, FL
 - b. Silica fume modified:
 - c. Other types may be used only with Engineer's approval in writing prior to bidding.
- C. Extreme Rapid Strength Form and Pour/Pump Repair Mortar: Flowable one-component, high strength silica-fume-modified repair mortar with 0.375 in. aggregate extendable, and containing an integral corrosion inhibitor. The product shall achieve minimum 3,000 psi compressive strength at 1 day and 8000 psi compressive strength at 28 days per ASTM C109 if neat and ASTM C39 if extended at a 9-inch slump.
1. Acceptable materials for this Work are as follows:
 - a. Polymer/Silica fume modified:
 - 1) “MasterEmaco S 477 CI,” by BASF Construction Chemicals, Shakopee, MN.
 - 2) “Eucocrete Supreme,” or “Concrete Top Supreme” by The Euclid Chemical Company, Cleveland, OH.
 - 3) “Rapid Road Repair” by The QUIKRETE Companies, Atlanta, GA

4) “Planitop 18 ES” by MAPEI Corporation, Deerfield Beach, FL

- b. Other types may be used only with Engineer's approval in writing prior to bidding.

2.2 MATERIAL ACCESSORIES

- A. Extended Open Time Epoxy Bonding Agent: Three component, water based, epoxy modified portland cement bonding agent and corrosion inhibitor coating providing the recommended Manufacturer's open time in which to apply repair mortar. Product shall be capable of achieving bond strength of 2,700 psi per ASTM C 882.

1. Acceptable materials for this Work are:

- a. “MasterEmaco P 124,” by BASF Construction Chemicals, Shakopee, MN.
- b. “Duralprep A.C.,” by The Euclid Chemical Company, Cleveland, OH.
- c. “Planibond 3-C” or Mapefer 1K,” by Mapei Corporation, Deerfield Beach, FL.
- d. “Sika Armatec 110 EpoCem”, by Sika Corporation, Lyndhurst, NJ.

2. Other types may be used only with Engineer's approval in writing prior to bidding.

- B. Epoxy Adhesive: 2 or 3 component, 100 percent solids, 100 percent reactive compound suitable for use on dry or damp surfaces. Product shall be capable of achieving bond strength of 1,800 psi per ASTM C 882.

1. Acceptable materials for this Work are:

- a. “MasterEmaco ADH 326”, by BASF Construction Chemicals, Shakopee, MN. “Kemko 001 or 008”, by ChemCo Systems, Inc., Redwood City, CA.
- b. “Euco #452 Epoxy,” or “Duralcrete”, by The Euclid Chemical Company, Cleveland, OH.
- c. “Planibond EBA” by Mapei Corporation, Deerfield Beach, FL.
- d. “Sikadur 32 Hi-Mod LPL”, by Sika Corporation, Lyndhurst, NJ.

2. Other types may be used only with Engineer's approval in writing prior to bidding.

2.3 STEEL REINFORCEMENT

- A. Epoxy-coated Reinforcing Bars: ASTM A775
- B. Epoxy-Coated Welded Wire Fabric: ASTM A884, fabricated from as-drawn steel wire into flat sheets, mats only. Roll stock prohibited.
- C. Provide bar supports according to CRSI's “Manual of Standard Practice.” Use all-plast bar supports when in contact with exposed concrete surface.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Surface Preparation: Cavity surfaces shall be clean and dry prior to commencement of patch installation. Preparation of cavity to receive new mortar shall be in accordance with Section "Surface Preparation for Patching" and manufacturer's instructions.

3.2 INSTALLATION

- A. Repair Mortar Bonding Grout:
 - 1. Mix and apply repair/patching mortar bonding grout in strict accordance with manufacturer's recommendations.
 - 2. If repair/patching mortar bonding grout dries, cavity shall not be patched until it has been cleaned again and prepared as specified in Section "Surface Preparation for Patching." Repair mortar/patching grout shall not be applied to more cavities than can be patched within 0.25 hr by available manpower.
- B. Epoxy Bonding Agent:
 - 1. In strict accordance with manufacturer's recommendations, mix and apply epoxy bonding agent to prior to placing forms in areas to receive form and pour repair mortar.
 - 2. Allow epoxy bonding agent to dry a minimum 2 hours, but no more than the Manufacturer's recommended open time prior to placing repair mortar.
- C. Mortar Placement: Mortar materials shall be placed immediately following repair/patching mortar bonding grout application in strict accordance with manufacturer's instructions. Properly proportioned and mixed mortar material shall be placed using tools to consolidate mortar so that no voids exist within new material and continuous contact with base concrete is achieved. Fresh repair/patching mortar bonding grout is required between successive lifts of mortar material.
- D. Form and Pour Repair Mortar Placement: Mortar materials shall be placed [a minimum of 2 hours and no more than the Manufacturer's recommended open time after application of the extended open time epoxy bonding agent][immediately following the bonding grout application]. Mix and apply in strict accordance with manufacturer's written instructions, to achieve a maximum 9" slump.

3.3 CONCRETE PROTECTION AND CURING

- A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 305R for hot-weather protection during placement. Keep concrete continually moist prior to

final curing by evaporation retarder, misting, sprinkling, or using absorptive mat or fabric covering kept continually moist.

- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.1 lb/sq. ft. x h before and during finishing operations. Apply material according to manufacturer's written instructions one or more times after placement, screeding and bull floating concrete, but prior to float finishing. Repeated applications are prohibited after float finishing has begun.

1. Acceptable evaporation retarder materials for this Work are:

- a. "Cimfilm", by Axim Concrete Technologies.
- b. "MasterKure ER 50", by BASF Construction Chemicals, Shakopee, MN.
- c. "AquaFilm", by Conspec Marketing & Manufacturing Co., Inc.
- d. "Sure-Film (J-74)", by Dayton Superior Corporation.
- e. "Eucobar", or "Tamms Surface Retarder", by The Euclid Chemical Company, Cleveland, OH.
- f. "E-Con", by L&M Construction Chemicals, Inc.
- g. "EVRT", by Russ Tech Admixtures, Inc.
- h. "SikaFilm", by Sika Corporation, Lyndhurst, NJ.

- C. Immediate upon conclusion of finishing operation cure concrete in accordance with ACI 308 for duration of at least seven days by moisture curing or moisture retaining covering. Provide additional curing immediately following initial curing and before concrete has dried.

1. Continue method used in initial curing.
2. Material conforming to ASTM C171.
3. Other moisture retaining covering as approved by Engineer.
4. During initial and final curing periods maintain concrete above 50°.
5. Prevent rapid drying at end of curing period.

- D. Concrete surfaces to receive slab coatings or penetrating sealers shall be cured with moisture curing or moisture-retaining cover.

- E. Dissipating Curing Compound [(VOC Compliant, less than 350 g/l)]: Comply with ASTM C 309, Type 1, Class A or B. Moisture loss shall be not more than 0.55 kg/m² when applied at 200 sq. ft/gal. Manufacturer's certification is required. Silicate based compounds are prohibited.

1. Subject to project requirements provide one of the following products:

- a. "Kurez DR VOX" or "Kurez RC," or "Kurez RC Off," The Euclid Chemical Company.
- b. "RxCure WB," or "RxCure VOC" or "W.B. Cure VOC," Conspec Marketing & Manufacturing.

- c. “MasterKure CC 160 WB” or “MasterKure CC 200 WB,” BASF Construction Chemicals.
 - d. “MAPECURE DR”, by MAPEI Corporation, Deerfield Beach, FL.
 - 2. Additional requirements:
 - a. With product submittal provide plan and procedures for removal of residual curing compound prior to application of sealers, coatings, stains, pavement markings and other finishes.
 - b. Provide a summary of testing to show adequate surface preparation for successful application of sealers, coatings, stains, pavement markings, and other finishes.
- F. Curing Methods: Cure formed and non-formed concrete moisture curing, moisture-retaining-cover curing, curing compound, or a combination of these as follows:
- 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
 - a. Water.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.
 - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
 - 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.4 FIELD QUALITY CONTROL OF AGGREGATE EXTENDED MATERIAL

- A. Testing Agency: Owner may engage a qualified independent testing and inspecting agency acceptable to the Engineer to sample materials, perform tests, and submit test reports during concrete placement according to requirements specified in this Article. Perform tests according to ACI 301.
- 1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mix exceeding 5 cu. yd. (4 cu. m), but less than 25 cu. yd. (19 cu. m), plus one set for each additional 50 cu. yd. (38 cu. m) or fraction thereof.
 - 2. Determine strength at 1, 7, and 28 days. Each test shall consist of two 6-inch diameter cylinders or three 4-inch diameter cylinders. Testing shall be in accordance with ASTM C39.

3.5 EVALUATION AND ACCEPTANCE OF WORK

A. Acceptance of Repairs (ACI 301):

1. Acceptance of completed concrete Work will be according to provisions of ACI 301.
2. Repair areas shall be sounded by Engineer and Contractor with hammer or rod after curing for 72 hours. Contractor shall repair all hollowness detected by removing and replacing patch or affected area at no extra cost to Owner.
3. If shrinkage cracks appear in repair area when initial curing period is completed, repair shall be considered defective, and it shall be removed and replaced by Contractor at no extra cost.

END OF SECTION 033761

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SECTION 036300 - EPOXY INJECTION SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections apply to this Section.

1.2 SUMMARY

- A. This Section includes the provision of all labor, materials, equipment, supervision and incidentals necessary to prepare cracks in structural concrete members and inject them with a 2-component, moisture-insensitive, 100 percent solids, low-viscosity epoxy resin system.
- B. Related Sections: Following Sections contain requirements that relate to this Section:
 - 1. Division 01 Section "Submittal Procedures."
 - 2. Division 02 Section "Work Items."
 - 3. Division 02 Section "General Concrete Surface Preparation."
 - 4. Division 02 Section "Surface Preparation for Patching."

1.3 REFERENCES

- A. "Standard Specifications for Structural Concrete," (ACI 301) by American Concrete Institute, herein referred to as ACI 301, is included in total as specification for this structure except as otherwise specified herein.
- B. Comply with provisions of following codes, specifications and standards except where more stringent requirements are shown on Drawings or specified herein:
 - 1. "Building Code Requirements for Reinforced Concrete," (ACI 318), American Concrete Institute, herein referred to as ACI 318.
 - 2. "Causes, Evaluation, and Repair of Cracks in Concrete Structures" (ACI 224.112), American Concrete Institute.
 - 3. "State-of-the-Art Report on Parking Structures" (ACI 326), American Concrete Institute.
 - 4. "Use of Epoxy Compounds with Concrete" (ACI 503), American Concrete Institute.
 - 5. "Standard Specification for Bonding Hardened Concrete, Steel, Wood, Brick, and Other Materials to Hardened Concrete with a Multi-Component Epoxy Adhesive" (ACI 503.1), American Concrete Institute.
 - 6. "Guide for Repair of Concrete Bridge Superstructures" Reported by ACI Committee 546 (ACI 546.1).

- C. Contractor shall have following ACI publications at Project construction site at all times:
1. "Use of Epoxy Compounds with Concrete" (ACI 503), American Concrete Institute.
 2. "Standard Specification for Bonding Hardened Concrete, Steel, Wood, Brick, and Other Materials to Hardened Concrete with a Multi-Component Epoxy Adhesive" (ACI 503.1), American Concrete Institute.

1.4 SUBMITTALS

- A. Make submittals in accordance with requirements of Division 01 and as specified in this Section.
- B. Contractor: Submit manufacturer's product data sheets, technical sheets, recommended application procedures and information on epoxy injection equipment.
- C. Testing Agency: Promptly report all test results to Engineer/Architect and Contractor. Include following information:
1. See Article "Quality Assurance," paragraph "Submit following information for Field Testing...."
 2. Visual examination of epoxy resin penetration.
- D. See requirements of Division 01 Section, "Submittal Procedures," Part 1 heading, "Submittal Procedures," for limits to resubmittals.
- E. See requirements of Division 01 Section, "Submittal Procedures," Part 2 heading, "Requests for Information," for RFI constraints.

1.5 WARRANTY

- A. System manufacturer and Contractor shall furnish Owner written single source performance guarantee that epoxy resin injection system will be free of defects related to design, workmanship or material deficiency for 3-year period from date of acceptance of Work required under this Section against leakage or bond failure:
1. Any adhesive or cohesive failure.
 2. Cracking or other weathering deficiency.
 3. Normal abrasion or tear failure.
- B. Any repair under this guarantee shall be done at no cost to Owner. Guarantee shall be provided by Contractor and manufacturer of system.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- A. Injection epoxy shall be one of following:
 - 1. "MasterInject 1380" or "MasterInject 1500" as manufactured by BASF Construction Chemicals., Shakopee, MN.
 - 2. "Sikadur 35 Hi-Mod LV" or "Sikadur 52" as manufactured by Sika Chemical Corporation, Lyndhurst, NJ.
 - 3. "Epoxy HP-LV" as manufactured by Hunt Process Corp-Southern, Ridgeland, MS.
 - 4. "Pro-Poxy 50 Super LV" as manufactured by Unitex, Kansas City, MO.
 - 5. "Eucopoxy" or "Duralcrete LV" as manufactured by The Euclid Chemical Company, Cleveland OH.
 - 6. "Sure Inject J56 SLV" as manufactured by Dayton Superior Corp., Miamisburg OH.
 - 7. "KonTek 11 LV" as manufactured by Contech Group, Inc. Seattle, WA.
 - 8. "Kemko 038" as manufactured by ChemCo Systems, Inc., Redwood City, CA.
- B. Epoxy gel shall be as specified by the selected injection epoxy manufacturer.
- C. Equipment:
 - 1. Epoxy injection unit shall be portable and equipped with positive displacement-type pumps with interlock to provide positive ration control of epoxy injection resin components. Pumps shall be air or electric powered and shall provide in-line mixing and metering system and shall be equipped with drain-back plugs.
 - 2. Equipment used to inject epoxy shall be capable of following:
 - a. Automatic proportioning of materials within mix ratio tolerances set by epoxy resin manufacturer.
 - b. Delivery of components, resin and hardeners, from separate reservoirs to mixing type discharge head.
 - c. Complete and uniform mixing of components at discharge head.
 - d. Injection of resin system at constant pressures not to exceed 150 psi.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Crack Identification:
 - 1. All cracks 0.03 in. wide or greater that are designated by Engineer/Architect, and not coincident with principal delamination, shall be injected. Cracks that occur coincident with principal delaminations shall not be injected.
 - 2. Cracks requiring repair shall be located by Contractor at time of construction and marked with chalk.
- B. Crack Preparation for Injection:

1. Surface of concrete adjacent to crack must be free of all laitance, efflorescence, dirt or foreign particles.
2. Cracks may be damp or dry as per injection material manufacturer's recommended installation procedures.
3. All cracks shall be properly sealed along their exposed length with an approved epoxy gel.
4. Epoxy injection ports shall be uniformly spaced along crack and shall be installed as recommended by system manufacturer. If concrete member being injected is exposed on both sides, provide injection ports on opposite sides at staggered intervals.
5. Apply epoxy gel around injection port to provide an adequate seal to prevent escape of injection resin from perimeter of port while under pressure.
6. Apply epoxy gel for sealing in manner that will result in minimal defacing or disorganization of concrete substrate.

3.2 INSTALLATION

A. Epoxy Injection:

1. Dispense epoxy injection resin under constant pressure in accordance with manufacturer's recommended procedures or as required to achieve maximum filling and penetration of crack without inclusion of air voids in epoxy resin material.
2. Injection shall begin at lowest port and progress incrementally higher.
3. Appearance of epoxy resin at next higher port shall be considered evidence of successful crack filling.
4. If penetration of epoxy resin into cracks is not possible, notify Engineer/Architect prior to discontinuing injection procedures. If alternate injection procedures are possible, submit procedure in writing to Engineer/Architect for review.
5. Contractor shall adhere to all limitations and cautions for epoxy resin injection material as per manufacturer's current printed literature.

B. Cleaning:

1. When cracks are completely filled, allow adhesive to cure for sufficient time to allow the removal of the surface seal without any draining or runback of epoxy material from the cracks.
2. Remove the surface seal material, ports, and injection adhesive runs or spills from concrete surfaces.
3. Finish the face of the crack flush to the adjacent concrete, removing any indentations or protrusions caused by the placement of entry ports.
4. Match work area to adjacent surface including any surface treatments.

END OF SECTION 036300

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SECTION 071800 – TRAFFIC COATINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections apply to this Section.

1.2 SUMMARY

- A. A single installer shall be responsible for providing complete water proofing system including all products specified in the following Sections:
 - 1. Division 07 Section, "Traffic Coatings"
 - 2. Division 07 Section, "Water Repellents"
 - 3. Division 07 Section, "Concrete Joint Sealants"
 - 4. Division 07 Section, "Expansion Joint Assemblies"
- B. This Section includes traffic topping: Fluid applied, waterproofing, traffic-bearing elastomeric membrane with integral wearing surface, where the surface to which membrane is to be applied is one or more of the following:
 - 1. Over assigned parking.
 - 2. Roof top parking.
- C. Materials shall be compatible with materials or related Work with which they come into contact, and with materials covered by this Section.
- D. Related Sections: Following Sections contain requirements that relate to this Section.
 - 1.
 - 2. Division 07 Section, "Water Repellents"
 - 3. Division 09 Section, "Pavement Markings."

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Materials shall be compatible with materials or related Work with which they come into contact, and with materials covered by this Section.
 - 2. Distribute reviewed submittals to all others whose Work is related.
- B. Make submittals in accordance with requirements of Division 01 Section, "Submittal Procedures:"

1. See requirements of Division 01 Section, "Submittal Procedures," Part 1 heading, "Submittal Procedures," for limits to resubmittals.
 2. See requirements of Division 01 Section, "Submittal Procedures," Part 2 heading, "Requests for Information," for RFI constraints.
- C. Submittals and Resubmittals: Engineer will review each of Contractor's shop drawings and/or submittal data the initial time and, should resubmittal be required, one additional time to verify that reasons for resubmittal have been addressed by Contractor and corrections made. Resubmittal changes/revisions/corrections shall be circled. Engineer will review only circled items and will not be responsible for non-circled changes/revisions/corrections and additions. Should additional resubmittals be required, Contractor shall reimburse Owner for all costs incurred, including the cost of Engineer's services made necessary to review such additional resubmittals. Owner shall in turn reimburse Engineer.
- D. Requests For Information
1. Engineer reserves the right to reject, unprocessed, any Request for Information (RFI) that the Engineer, at its sole discretion, deems frivolous.
 2. Engineer reserves the right to reject, unprocessed, any RFI that the Engineer, at its sole discretion, deems already answered in the Contract Documents.
 3. RFI process shall not be used for requesting substitutions. Procedures for substitutions are clearly specified elsewhere in the contract documents.

1.4 ACTION SUBMITTALS

- A. Product Data: For each system indicated at least 60 days prior to application.
1. Product description, technical data, appropriate applications and limitations.
 2. Primer type and application rate
 3. Material, and wet mils required to obtain specified dry thickness for each coat.
 4. Type, gradation and aggregate loading required within each coat.
- B. Samples:
1. One 4 in. by 4 in. stepped sample showing each component for each system indicated.
- C. Sample Warranty: For each system indicated.

1.5 INFORMATION SUBMITTALS

- A. Certificates
1. Certification that products and installation comply with applicable federal, state of Maine, and local EPA, OSHA and VOC requirements regarding health and safety hazards.

2. Evidence of applicator's being certified by manufacturer. Evidence shall include complete copy of manufacturer's licensing/certification document, spelling out repair responsibility for warranty claims.
 3. Certification from the Manufacturer that finishes as specified are acceptable for system to be installed at least 1 month before placement of any concrete which will receive traffic topping.
 4. Certification stating static coefficient of friction meets minimum requirements of Americans with Disabilities Act (ADA).
 5. Certification stating materials have been tested and listed for UL 790 Class "A" rated materials/system by UL for traffic topping application specified on project. Containers shall bear UL labels.
 6. Certification from manufacturer confirming compatibility with existing underlying coatings and/or substrate.
- B. Manufacturer's Instructions: for each system indicated.
1. Crack treatment and surface preparation method and acceptance criteria.
 2. Method of application of each coat.
 3. Maximum and minimum allowable times between coats.
 4. Final cure time before resumption of parking and/or paint striping.
 5. Any other special instructions required to ensure proper installation.
- C. Qualification Statements
1. Manufacturer's qualifications as defined in the "Quality Assurance" article.
 2. Installer's qualifications as defined in the "Quality Assurance" article.
 3. Signed statement from applicator certifying that applicator has read, understood, and shall comply with all requirements of this Section.

1.6 CLOSEOUT SUBMITTALS

- A. Three copies of System Maintenance Manual.
- B. Final executed Warranty.

1.7 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Owner retains right to reject any manufacturer.
1. Evidence of acceptable previous work on WALKER-designed projects. If none, so state.
 2. Evidence of financial stability acceptable to Engineer/Architect.
 3. Listing of 20 or more projects completed with submitted system, to include:
 - a. Name and location of project.
 - b. Type of system applied.
 - c. On-Site contact with phone number.

- B. Manufacturer's technical representative, acceptable to Engineer/Architect, shall be on site during surface preparation and initial stages of installation.
- C. Installer's Qualifications: Owner retains right to reject any manufacturer.
 - 1. Evidence of compliance with Summary article paragraph "A single installer. . ."
 - 2. Evidence that installer has successfully performed or has qualified staff who have successfully performed at least 5 verifiable years of installations similar to those involved in this Contract, and minimum 10 projects with submitted system.
 - 3. Listing of 5 or more installations in climate and size similar to this Project performed by installer's superintendent.
- D. Certifications
 - 1. Traffic Topping shall satisfy the current National Volatile Organic Compound (VOC) Emission Standards for Architectural Coatings.
 - 2. Licensing/certification document from manufacturer that confirms system installer is a licensed/certified applicator for the manufacturer and is legally licensed to perform work.
 - 3. Licensing/certification agreement shall include following information:
 - a. Applicator's financial responsibility for warranty burden under agreement terms.
 - b. Manufacturer's financial responsibility for warranty burden under agreement terms.
 - c. Process for dispute settlement between manufacturer and applicator in case of system failures where cause is not evident or cannot be assigned.
 - d. Authorized signatures for both Applicator Company and Manufacturer.
 - e. Commencement date of agreement and expiration date (if applicable).

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver all materials to site in original, unopened containers, bearing following information:
 - 1. Name of product.
 - 2. Name of manufacturer.
 - 3. Date of preparation.
 - 4. Lot or batch number.
- B. Store materials under cover and protect from weather. Replace packages or materials showing any signs of damage with new material at no additional cost to Owner.

1.9 FIELD CONDITIONS

- A. Weather and Substrate Conditions: Proceed with work only when existing and forecast weather and temperature of concrete substrate will permit work in accordance with manufacturer's recommendations.

1.10 WARRANTY

- A. System Manufacturer (Complete System Recoating): Furnish Owner with written total responsibility Joint and Several Warranty, detailing responsibilities of manufacturer and applicator with regard to warranty requirements (Joint and Several). The warranty shall provide that system will be free of defects, water penetration and chemical damage related to system design, workmanship or material deficiency, consisting of:
1. Any adhesive or cohesive failures.
 2. Spalling surfaces.
 3. Weathering.
 4. Surface crazing (does not apply to traffic topping protection course).
 5. Abrasion or tear failure resulting from normal traffic use.
 6. Failure to bridge cracks less than 0.0625 in. or cracks existing at time of traffic topping installation on double tees only.
- B. If material surface shows any of defects listed above, supply labor and material to repair all defective areas and to repaint all damaged line stripes.
- C. Warranty period shall be a **5 year Joint and Several Warranty** commencing with date of acceptance of work.
- D. Perform any repair under this warranty at no cost to Owner.
- E. Address the following in the terms of the Warranty: length of warranty, change in value of warranty – if any- based on length of remaining warranty period, transferability of warranty, responsibilities of each party, notification procedures, dispute resolution procedures, and limitations of liability for direct and consequential damages.
- F. Snowplows, vandalism, and abnormally abrasive maintenance equipment are not normal traffic use and are exempted from warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer: Subject to compliance with requirements, provide products of 1 of following, only where specifically named in product category:
1. BASF Building Systems (BASF), Shakopee, MN
 2. Neogard Division of Jones-Blair Company (Neogard), Dallas, TX.
 3. Sika Corporation (Sika), Lyndhurst, NJ.
 4. Tremco (Tremco), Cleveland, OH.

2.2 MATERIALS, TRAFFIC TOPPING

- A. Acceptable toppings are listed below. One will be selected as an alternate. In bid form, list bid price for each topping listed below. Contract for topping will not necessarily be directed to lowest bid priced topping. Toppings shall be compatible with all other materials in this Section and related work.
1. Medium Duty – **Column Top Only** :
 - a. Autogard, Neogard.
 - b. Iso-Flex 750U-HL MVT/760U-HL MVT Deck Coating System, LymTal.
 - c. Qualideck Medium Vehicular (152/252/372/512), APT
 - d. Sikalastic 710/715, Sika.
 - e. Sonoguard Vehicular Deck System, BASF.
 - f. Vulkem 350/345/345/346 Deck Coating System, Tremco.
 - g. Flexodeck Mark 170.2 Solvent Free Medium Duty, Poly-Carb.
 2. Heavy Duty: All Floor (horizontal applications)
 - a. Autogard HD-48, Autogard E, Neogard.
 - b. Iso-Flex 750U-HL HVT/760U-HL HVT Deck Coating System, LymTal.
 - c. Qualideck Heavy Vehicular (152/252/372/512), APT
 - d. Sikalastic 710/715, Sika.
 - e. Sonoguard Vehicular Deck System, BASF.
 - f. Vulkem 350/345/346/346 Deck Coating System, Tremco.
 - g. Flexodeck Mark 170.2 Solvent Free Heavy Duty, Poly-Carb.
- B. Recoating **Complete System**: Provide complete traffic topping system with all components specified for new, heavy-duty applications, including all waterproofing and wearing courses.
- C. Provide ultraviolet screening for all traffic topping placed on this project.
- D. Finish top coat shall be colored grey.
- E. Substitutions: **None** for this project. Contact Engineer/Architect for consideration for future projects.

2.3 MATERIALS, CRACK SEALER

- A. Repair for isolated random horizontal cracks 0.01 in. to 0.06 in. wide. Acceptable products:
1. SikaPronto 19TF, Sika.
 2. Degadeck, Crack Sealer Plus, BASF.
 3. Denedeck Crack Sealer, Deneef.
 4. Iso-Flex 609 Epoxy Crack Sealer, Lymtal.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to receive Work and report immediately in writing to Engineer/Architect any deficiencies in surface which render it unsuitable for proper execution of Work.
- B. Coordinate and verify that related Work meets following requirements before beginning surface preparation and application:
 - 1. Concrete surfaces are finished as acceptable for system to be installed. Correct all high points, ridges, and other defects in a manner acceptable to the Engineer/Architect.
 - 2. Curing compounds used on concrete surfaces are compatible with system to be installed.
 - 3. Concrete surfaces have completed proper curing period for system selected.
 - 4. Joint Sealants are compatible with traffic toppings.

3.2 PREPARATION

- A. Seal all openings to occupied space to prevent cleaning materials, solvents and fumes from infiltration. All protective measures and/or ventilating systems required to prevent infiltration are incidental to this Work.
- B. Acid etching is prohibited.
- C. Remove all laitance and surface contaminants, including oil, grease and dirt by shotblasting. Prepare by sandblasting all surfaces inaccessible to shotblast equipment.
- D. Before applying materials, apply system to small area to assure that it will adhere to substrate and joint sealants and dry properly and to evaluate appearance.
- E. All cracks on concrete surface shall be prepared in accordance with manufacturer's recommendations.
- F. All random cracks on concrete surface less than 0.03 in. wide and showing no evidence of water and/or salt water staining on ceiling below shall receive detail coat unless more complete treatment required in accordance with manufacturer's recommendations. Rout and seal random cracks, construction joints and control joints prior to installation of primer or base coat. Crack preparation including installation of joint sealant material, where required, is incidental to traffic topping work.
- G. Mask off adjoining surfaces not to receive traffic topping and mask off drains to prevent spillage and migration of liquid materials outside membrane area. Provide neat/straight lines at termination of traffic topping.

3.3 INSTALLATION/APPLICATION

- A. Do all Work in accordance with manufacturer's written instructions and specifications including, but not limited to, moisture content of substrate, atmospheric conditions (including relative humidity and temperature), coverages, mil thicknesses and texture, and as shown on Drawings.
- B. A primer coat is required for all systems. No exception.
- C. Do not apply traffic topping material until concrete has been air dried at temperatures at or above 40°F. for at least 30 days after curing period specified.
- D. Cease material installation under adverse weather conditions, or when temperatures are outside manufacturer's recommended limitations for installation, or when temperature of work area or substrate are below 40°F.
- E. All adjacent vertical surfaces shall be coated with traffic topping minimum of 4 in. above coated horizontal surface. Requirement includes, but is not limited to pipes, columns, walls, curbs (full height of vertical faces of all curbs) and islands.
- F. Complete all Work under this Section before painting line stripes.
- G. Clean off excess material and material smears adjacent to joints as work progresses using methods and materials approved by manufacturers.

3.4 FIELD QUALITY CONTROL

- A. Develop a quality control plan for assured specified uniform membrane thickness that utilizes grid system of sufficiently small size to designate coverage area of not more than 5 gallons at specified thickness. In addition, employ wet mil gauge to continuously monitor thickness during application. Average specified wet mil thickness shall be maintained within grid during application with minimum thickness of not less than 80% of average acceptable thickness. Immediately apply more material to any area not maintaining these standards.
- B. Determine overall topping system mil thickness:
 - 1. Contractor shall provide 6 in. by 6 in. bond breaker (topping coupon) on concrete surface for each 25,000 sq ft, or fraction thereof, of topping to be placed as directed by Engineer/Architect and manufacturer. Dimensionally locate coupon for easy removal.
 - 2. Contractor shall assist Testing Agency in removing topping coupons from concrete surface at completion of manufacturer-specified cure period. Contractor shall repair coupon area per topping manufacturer's instructions.
 - 3. Testing Agency shall determine dry mil thickness of completed Traffic Topping System, including bond breaker. Take 9 readings (minimum), 3 by 3 pattern at 2 in. on center. No reading shall be taken closer than 1 in. from coupon edge. Report individual readings and overall topping system average to Engineer/Architect. Readings shall be made with micrometer or optical comparator.

END OF SECTION 071800

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SECTION 071900 – WATER REPELLENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. A single installer shall be responsible for providing complete water proofing system including all products specified in the following Sections:
 - 1. Division 03 Section, "Cast-In-Place Restoration"
 - 2. Division 07 Section, "Traffic Coatings"
 - 3. Division 07 Section, "Water Repellents"
 - 4. Division 07 Section, "Concrete Joint Sealants"
 - 5. Division 07 Section, "Expansion Joint Assemblies"
- B. This Section includes penetrating concrete sealer on these surfaces:
 - 1. Supported concrete floor and concrete roof surfaces including curbs, walks, islands and pour strips.
- C. Related Sections: Following Sections contain requirements that relate to this Section.
 - 1. Division 03 Section, "Cast-in-Place Concrete Restoration."
 - 2. Division 07 Section, "Traffic Coatings"
 - 3. Division 07 Section, "Concrete Joint Sealants"
 - 4. Division 07 Section, "Expansion Joint Assemblies"
 - 5. Division 09 Section, "Pavement Markings."

1.3 REFERENCES

- A. ASTM International (ASTM):
 - 1. ASTM D6489, "Standard Test Method for Determining the Water Absorption of Hardened Concrete Treated with a Water Repellent Coating."

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:

1. Materials shall be compatible with materials or related Work with which they come into contact, and with materials covered by this Section.
 2. Distribute reviewed submittals to all others whose Work is related.
- B. Make submittals in accordance with requirements of Division 01 Section, "Submittal Procedures:"
1. See requirements of Division 01 Section, "Submittal Procedures," Part 1 heading, "Submittal Procedures," for limits to resubmittals.
 2. See requirements of Division 01 Section, "Submittal Procedures," Part 2 heading, "Requests for Information," for RFI constraints.
- C. Submittals and Resubmittals: Engineer will review each of Contractor's shop drawings and/or submittal data the initial time and, should resubmittal be required, one additional time to verify that reasons for resubmittal have been addressed by Contractor and corrections made. Resubmittal changes/revisions/corrections shall be circled. Engineer will review only circled items and will not be responsible for non-circled changes/revisions/corrections and additions. Should additional resubmittals be required, Contractor shall reimburse Owner for all costs incurred, including the cost of Engineer's services made necessary to review such additional resubmittals. Owner shall in turn reimburse Engineer.
- D. Requests For Information
1. Engineer reserves the right to reject, unprocessed, any Request for Information (RFI) that the Engineer, at its sole discretion, deems frivolous.
 2. Engineer reserves the right to reject, unprocessed, any RFI that the Engineer, at its sole discretion, deems already answered in the Contract Documents.
 3. RFI process shall not be used for requesting substitutions. Procedures for substitutions are clearly specified elsewhere in the contract documents.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated at least 60 days prior to application.
1. Product description, technical data, appropriate applications, and limitations.
 2. Areas and application rates of materials to be applied.
 3. Proposed alternate application methods, if any.

1.6 INFORMATION SUBMITTALS

- A. Certificates
1. Certification that products and installation comply with applicable federal, state of Maine, and local EPA, OSHA and VOC requirements regarding health and safety hazards.

2. Evidence of applicator's being certified by manufacturer. Evidence shall include complete copy of manufacturer's licensing/certification document, spelling out repair responsibility for warranty claims.

B. Field Quality Control

1. ASTM D6489 Test Results
2. Two copies of manufacturer's technical representative's log for each visit.

C. Qualification Statements

1. Manufacturer's qualifications as defined in the "Quality Assurance" article.
2. Installer's qualifications as defined in the "Quality Assurance" article.
3. Signed statement from applicator certifying that applicator has read, understood, and shall comply with all requirements of this Section.

1.7 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Owner retains right to reject any manufacturer.

1. Evidence of acceptable previous work on WALKER-designed projects. If none, so state.
2. Evidence of financial stability acceptable to Engineer/Architect.
3. Listing of 20 or more projects completed with submitted system, to include:
 - a. Name and location of project.
 - b. Type of system applied.
 - c. On-Site contact with phone number.

B. Installer's Qualifications: Owner retains right to reject any installer.

1. Evidence of compliance with Summary article paragraph "A single installer. . ."
2. Evidence that installer has successfully performed or has qualified staff who have successfully performed at least 5 verifiable years of installations similar to those involved in this Contract, and minimum 10 projects with submitted system.
3. Listing of 5 or more installations in climate and size similar to this Project performed by installer's superintendent.

C. Certifications

1. Sealer shall satisfy the current national and local Volatile Organic Compound (VOC) Emission Standards for Architectural Coatings.
2. Licensing/certification document from system manufacturer that confirms system installer is a licensed/certified applicator for the manufacturer and is legally licensed to perform work.
3. Licensing/certification agreement must provide following information:
 - a. Applicator's financial responsibility for warranty burden under agreement terms.

- b. Manufacturer's financial responsibility for warranty burden under agreement terms.
- c. Process for dispute settlement between manufacturer and applicator in case of system failures where cause is not evident or cannot be assigned.
- d. Officers' signatures for both Applicator Company and Manufacturer.
- e. Commencement date of agreement and expiration date (if applicable).

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver all materials to site in original, unopened containers, bearing following information:
 - 1. Name of product.
 - 2. Name of manufacturer.
 - 3. Date of preparation.
 - 4. Lot or batch number.
- B. Store materials under cover and protect from weather. Replace packages or materials showing any signs of damage with new material at no additional cost to Owner.
- C. Do not store material on slabs to be post-tensioned before final post-tensioning of slabs is accomplished. At no time shall weight of stored material being placed on slab area, after post-tensioning is completed and concrete has reached specified 28 day strength, exceed total design load of slab area. Between time final post-tensioning is accomplished and time concrete has reached specified 28 day strength, weight of stored material placed on slab area shall not exceed half total design load of slab area.

1.9 FIELD CONDITIONS

- A. Weather and Substrate Conditions: Do not proceed with application (except with written recommendation of manufacturer) under any of the following conditions:
 - 1. Ambient temperature is less than 40° F.
 - 2. Substrate surfaces have cured for less than 1 month.
 - 3. Rain or temperatures below 40° F predicted for a period of 24 hours.
 - 4. Less than 24 hours after surfaces became wet.
 - 5. Substrate is frozen or surface temperature is less than 40° F.
 - 6. Wind velocities higher than manufacturer's specified limit to prevent solvent flash-off.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer: Subject to compliance with requirements, provide products of one of following, only where specifically named in product category:

1. Advanced Chemical Technologies Inc. (ACT), Oklahoma City, OK.
2. BASF Building Systems (BASF), Shakopee, MN.
3. Deneef Construction Chemicals (Deneef), Houston, TX.
4. Evonik Degussa Corporation (Evonik Degussa), Parsippany, NJ.
5. Euclid Chemical Company (Euclid), Cleveland, OH.
6. Lymtal International Inc. (Lymtal), Lake Orion, MI.
7. Prosoco, Inc. (Prosoco), Lawrence, KS
8. Sika Corporation (Sika), Lyndhurst, NJ.

2.2 MATERIALS, CONCRETE SEALER

- A. Silane Water-Based, (50% solids, 400 g/L or less VOC):
1. MasterProtect H 400, 125 sf/g, BASF.
 2. Iso-Flex 618-50 WB, 125 sf/g, LymTal.
 3. Protectosil Aqua-Trete 40, 125 sf/g, Evonik Degussa.
- B. Silane/Siloxane Blend (250 g/L or less VOC):
1. Iso-Flex 628, 125 sf/g, LymTal.
 2. Sikagard 701W ,125 sf/g, Sika
- C. Silane/Siloxane Blend (100 g/L or less VOC):
1. Baracade WB 244, 125 sf/g, Euclid.
 2. Siloxane WB Concentrate, 125 sf/g, Prosoco.
- D. Proposed substitutions: None for this project. Contact Engineer/Architect for consideration for future projects.

2.3 MATERIALS, CRACK SEALER

- A. Repair for isolated random horizontal cracks 0.01 in. to 0.06 in. wide. Acceptable products:
1. SikaPronto 19TF, Sika.
 2. Sikadur 55 SLV Epoxy Crack Healer/Sealer, Sika.
 3. MasterSeal 630, BASF.
 4. Denedeck Crack Sealer, Deneef.
 5. Iso-Flex 609 Epoxy Crack Sealer, Lymtal.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to receive Work and report immediately in writing to Engineer/Architect any deficiencies in surface which render it unsuitable for proper execution of Work.
- B. Coordinate and verify that related Work meets following requirements before beginning surface preparation and application:
 - 1. Concrete surface finishes are acceptable for system to be installed.
 - 2. Curing compounds used on concrete surfaces are compatible with system to be installed.
 - 3. Concrete surfaces have completed proper curing period for system selected.
 - 4. Control joint and expansion joint Work is complete and has been accepted by Engineer/Architect.

3.2 PREPARATION

- A. Seal all openings to occupied space to prevent cleaning materials, solvents and fumes from infiltration. All protective measures and/or ventilating systems required to prevent infiltration are incidental to this Work.
- B. Acid etching is prohibited.
- C. Repair or replace all sealant materials damaged by surface preparation operations.
- D. Shot blast clean all surfaces to be sealed as acceptable to sealer manufacturer before sealer application. Shot blasting is not recommended or required for new slabs that are water cured per ACI 308, Paragraph 2.2. Cleaning method and materials shall be sufficient to allow absorption criteria stated in Field Quality Control article to be met. Prepare by sandblasting all surfaces inaccessible to shotblast equipment.
- E. Equipment used during floor slab cleaning shall not exceed height limitation of facility and shall not exceed 3,000 lb axle load or vehicle gross weight of 6,000 lb.
- F. Mask off adjoining surfaces not to receive sealer and mask off drains to prevent spillage and migration of liquid materials outside sealer area. Provide neat/straight lines at termination of sealer.

3.3 INSTALLATION/APPLICATION

- A. Do all Work in accordance with manufacturer's written instructions and specifications including, but not limited to, moisture content of substrate, atmospheric conditions (including relative humidity and temperature), coverage, mil thickness and texture, and as shown on Drawings.
- B. Clean all surfaces affected by sealer material overspray and repair all damage caused by sealer material overspray to adjacent construction or property at no cost to Owner.

- C. Clean off excess material as work progresses using methods and materials approved by manufacturer.

3.4 NON-CONFORMING WORK

- A. Unsatisfactory Field Quality Control test results shall be grounds for rejection of sealer or sealer application rate. Perform sealer reapplication at no additional cost to Owner.

END OF SECTION 071900

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SECTION 079233 – CONCRETE JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections apply to this Section.

1.2 SUMMARY

- A. A single installer shall be responsible for providing complete water proofing system including all products specified in the following Sections:
 - 1. Division 07 Section, "Traffic Coatings"
 - 2. Division 07 Section, "Water Repellents"
 - 3. Division 07 Section, "Concrete Joint Sealants"
 - 4. Division 07 Section, "Expansion Joint Assemblies"
- B. This Section includes the following:
 - 1. Exterior joints in the following horizontal traffic bearing surfaces:
 - a. Construction joints in cast-in-place concrete.
 - b. Control joints in pour strips, slabs and topping slabs.
 - c. Perimeter of all floor drains.
 - 2. Exterior joints in the following vertical and horizontal non-traffic surfaces:
 - a. Joints between precast concrete units.
 - b. Cove joints at intersection of horizontal and vertical concrete.
 - c. Exterior horizontal joints between precast and cast-in-place concrete. Color to match precast concrete.
- C. Related Sections: Following Sections contain requirements that relate to this Section.
 - 1. Division 01 Section "Submittal Procedures."
 - 2. Division 02 Section "Work Items."
 - 3. Division 07 Section "Expansion Joint Assemblies."
 - 4. Division 07 Section "Water Repellents."
 - 5. Division 07 Section "Traffic Coatings."
 - 6. Division 09 Section "Pavement Marking."

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Materials shall be compatible with materials or related Work with which they come into contact, and with materials covered by this Section.
 - 2. Distribute reviewed submittals to all others whose Work is related.
 - 3. Coordinate layout of joint system and approve methods for providing joints with precast concrete and concrete contractors.
 - 4. Inspect site and precast plant before precast production to insure proper joint configuration.
- B. Make submittals in accordance with requirements of Division 01 Section, "Submittal Procedures:"
 - 1. See requirements of Division 01 Section, "Submittal Procedures," Part 1 heading, "Submittal Procedures," for limits to resubmittals.
 - 2. See requirements of Division 01 Section, "Submittal Procedures," Part 2 heading, "Requests for Information," for RFI constraints.
- C. Submittals and Resubmittals: Engineer will review each of Contractor's shop drawings and/or submittal data the initial time and, should resubmittal be required, one additional time to verify that reasons for resubmittal have been addressed by Contractor and corrections made. Resubmittal changes/revisions/corrections shall be circled. Engineer will review only circled items and will not be responsible for non-circled changes/revisions/corrections and additions. Should additional resubmittals be required, Contractor shall reimburse Owner for all costs incurred, including the cost of Engineer's services made necessary to review such additional resubmittals. Owner shall in turn reimburse Engineer.
- D. Requests For Information
 - 1. Engineer reserves the right to reject, unprocessed, any Request for Information (RFI) that the Engineer, at its sole discretion, deems frivolous.
 - 2. Engineer reserves the right to reject, unprocessed, any RFI that the Engineer, at its sole discretion, deems already answered in the Contract Documents.
 - 3. RFI process shall not be used for requesting substitutions. Procedures for substitutions are clearly specified elsewhere in the contract documents.

1.4 ACTION SUBMITTALS

- A. Product Data: For each system indicated at least 60 days prior to application.
 - 1. Product description, technical data, appropriate applications and limitations.
 - 2. Primer type and application rate
- B. Samples:
 - 1. One for each system indicated.
- C. Sample Warranty: For each system indicated.

1.5 INFORMATION SUBMITTALS

A. Certificates:

1. Evidence of installer's being certified by manufacturer. Evidence shall include complete copy of manufacturer's licensing/certification document, spelling out repair responsibility for warranty claims.
2. Certification from the Manufacturer that joint details as specified are acceptable for system to be installed at least 1 month before placement of any concrete which will receive joint sealant.

B. Qualification Statements:

1. Manufacturer's qualifications as defined in the "Quality Assurance" article.
2. Installer's qualifications as defined in the "Quality Assurance" article.
3. Signed statement from this Section applicator certifying that applicator has read, understood, and shall comply with all requirements of this Section.

1.6 CLOSEOUT SUBMITTALS

A. Three copies of System Maintenance Manual.

B. Final executed Warranty.

1.7 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Owner retains right to reject any manufacturer.

1. Evidence of acceptable previous work on WALKER-designed projects. If none, so state.
2. Evidence of financial stability acceptable to Engineer/Architect.
3. Listing of 20 or more projects completed with submitted system, to include:
 - a. Name and location of project.
 - b. Type of system applied.
 - c. On-Site contact with phone number.

B. Manufacturer's technical representative, acceptable to Engineer/Architect, shall be on site during surface preparation and initial stages of installation.

C. Installer's Qualifications: Owner retains right to reject any installer or subcontractor.

1. Installer shall be legally licensed to perform work in the state of Maine. Evidence of compliance with Summary article paragraph "A single installer. . ."
2. Evidence that installer has successfully performed or has qualified staff who have successfully performed at least 5 verifiable years of installations similar to those involved in this Contract, and minimum 10 projects with submitted system.

3. Listing of 5 or more installations in climate and size similar to this Project performed by installer's superintendent.

D. Certifications:

1. Licensing/certification document from system manufacturer that confirms system installer is a licensed/certified applicator for the manufacturer
2. Licensing/certification agreement shall include following information:
 - a. Applicator's financial responsibility for warranty burden under agreement terms.
 - b. Manufacturer's financial responsibility for warranty burden under agreement terms.
 - c. Process for dispute settlement between manufacturer and applicator in case of system failures where cause is not evident or cannot be assigned.
 - d. Authorized signatures for both Applicator Company and Manufacturer.
 - e. Commencement date of agreement and expiration date (if applicable).

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver all materials to site in original, unopened containers, bearing following information:
 1. Name of product.
 2. Name of manufacturer.
 3. Date of preparation.
 4. Lot or batch number.
- B. Store materials under cover and protect from weather. Replace packages or materials showing any signs of damage with new material at no additional cost to Owner.
- C. Do not store material on slabs to be post-tensioned before final post-tensioning of slabs is accomplished. At no time shall weight of stored material being placed on slab area, after post-tensioning is completed and concrete has reached specified 28 day strength, exceed total design load of slab area. Between time final post-tensioning is accomplished and time concrete has reached specified 28 day strength, weight of stored material placed on slab area shall not exceed half total design load of slab area.

1.9 FIELD CONDITIONS

- A. Weather and Substrate Conditions: Proceed with work only when existing and forecast weather and temperature of concrete substrate will permit work in accordance with manufacturer's recommendations.

1.10 WARRANTY

- A. System Manufacturer and Contractor shall furnish Owner written single source performance guarantee that the joint sealant system will be free of defects, water penetration and chemical damage related to system design, workmanship or material deficiency, consisting of:
 - 1. Any adhesive or cohesive failures.
 - 2. Weathering.
 - 3. Abrasion or tear failure resulting from normal traffic use.
- B. If material surface shows any of defects listed above, supply labor and material to repair all defective areas and to repaint all damaged line stripes.
- C. Warranty period shall be a 5 year period commencing with date of acceptance of work.
- D. Perform any repair under this warranty at no cost to Owner.
- E. Address the following in the terms of the Warranty: length of warranty, change in value of warranty – if any- based on length of remaining warranty period, transferability of warranty, responsibilities of each party, notification procedures, dispute resolution procedures, and limitations of liability for direct and consequential damages.
- F. Snowplows, vandalism, and abnormally abrasive maintenance equipment are not normal traffic use and are exempted from warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer: Subject to compliance with requirements, provide products of 1 of following, only where specifically named in product category:
 - 1. BASF Building Systems (BASF), Shakopee, MN.
 - 2. Dow Corning Corp. (Dow Corning), Midland, MI.
 - 3. Lyntal International Inc. (Lyntal), Lake Orion, MI.
 - 4. Pecora Corporation (Pecora), Harleysville, PA.
 - 5. Sika Corporation (Sika), North Canton, OH.
 - 6. Sonneborn, a Division of BASF Construction Chemicals (BASF).
 - 7. Tremco (Tremco), Cleveland, OH.

2.2 MATERIALS, JOINT SEALANT SYSTEM

- A. Provide complete system of compatible materials designed by manufacturer to produce waterproof, traffic-bearing control joints as detailed on Drawings.
- B. Compounds used for sealants shall not stain masonry or concrete. Aluminum pigmented compounds not acceptable.

- C. Color of sealants shall match adjacent surfaces.
- D. Closed cell or reticulated backer rods: Acceptable products:
 - 1. "Sof Rod," Nomaco Inc., 501 NMC Drive, Zebulon, NC 27597. (800) 345-7279 ext. 341.
 - 2. "ITP Soft Type Backer Rod," Industrial Thermo Polymers Limited, 2316 Delaware Ave., Suite 216, Buffalo, NY 14216. (800) 387-3847.
 - 3. "Sonneborn Soft Type Backer Rod," Sonneborn, Minneapolis, MN.
- E. Bond breakers and fillers: as recommended by system manufacturer.
- F. Primers: as recommended by sealant manufacturer.
- G. Acceptable sealants are listed below. Sealants shall be compatible with all other materials in this Section and related work.
- H. Acceptable polyurethane control joint sealants (traffic bearing):
 - 1. Sonolastic NS-2, BASF.
 - 2. Iso-flex 880 GB, Lymtal.
 - 3. Sikaflex-2c NS, Sika.
 - 4. THC-900/901, Vulkem 45SNS, or Vulkem 245, Tremco.
- I. Acceptable polyurethane cove joints sealants (non-traffic bearing):
 - 1. Sikaflex-2c NS, Sika.
 - 2. Sonolastic NP-2, BASF.
 - 3. Dymeric 240/240FC or THC 901 (cove only), Tremco.
 - 4. Iso-flex 881, Lymtal.
- J. Acceptable silicone vertical joint sealants (non-traffic bearing):
 - 1. Spectrem 1 or Spectrem 4-TS, Tremco.
 - 2. 311-NS, Pecora.
 - 3. Dow Corning NS Parking Structure Sealant, Dow Corning.
- K. Proposed Substitutions: **None** for this project. Contact Engineer/Architect for consideration for future projects.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to receive Work and report immediately in writing to Engineer/Architect any deficiencies in surface which render it unsuitable for proper execution of Work.

- B. Coordinate and verify that related Work meets following requirements before beginning installation
 - 1. Concrete surfaces are finished as acceptable for system to be installed.
 - 2. Curing compounds used on concrete surfaces are compatible with system to be installed.
 - 3. Concrete surfaces have completed proper curing period for system selected.

3.2 PREPARATION

- A. Seal all openings to occupied space to prevent cleaning materials, solvents and fumes from infiltration. All protective measures and/or ventilating systems required to prevent infiltration are incidental to this Work.
- B. Correct unsatisfactory conditions before installing sealant system.
- C. Acid etching is prohibited.
- D. Grind joint edges smooth and straight with beveled grinding wheel before sealing. All surfaces to receive sealant shall be dry and thoroughly cleaned of all loose particles, laitance, dirt, dust, oil, grease or other foreign matter. Obtain written approval of method from system manufacturer before beginning cleaning.
- E. Check preparation of substrate for adhesion of sealant.
- F. Prime and seal joints and protect as required until sealant is fully cured. A primer coat is required for all systems.

3.3 INSTALLATION/APPLICATION

- A. Do all Work in strict accordance with manufacturer's written instructions and specifications including, but not limited to, moisture content of substrate, atmospheric conditions (including relative humidity and temperature), thicknesses and texture, and as shown on Drawings.
- B. Completely fill joint without sagging or smearing onto adjacent surfaces.
- C. Fill horizontal joints slightly recessed to avoid direct contact with wheel traffic.
- D. Clean off excess material and material smears adjacent to joints as work progresses using methods and materials approved by manufacturers.
- E. Cease material installation under adverse weather conditions, or when temperatures are outside manufacturer's recommended limitations for installation, or when temperature of work area or substrate are below 40°F.

3.4 FIELD QUALITY CONTROL

- A. Contractor and Engineer/Architect will jointly determine which one of following 2 methods of sealant testing to verify sealant profile:
 - 1. Contractor, at Engineer/Architect's direction, shall cut out lesser of 1% of total lineal footage placed or total of 100 lineal ft of joint sealant at isolated/random locations (varying from in. to ft of material) for Engineer/Architect and Manufacturer's Representative inspection of sealant profile.
 - 2. Contractor, at Engineer/Architect's direction, shall install 3 trial joint sections of 20 ft each. Contractor shall cut out joint sections, as selected by Engineer/Architect, for Engineer/Architect and Manufacturer's Representative inspection. Additional isolated/random removals may be required where sealant appears deficient. Total cut out sealant shall not exceed lesser of 1% of total lineal footage placed or total of 100 lineal ft of joint sealant at isolated/random locations (varying from in. to ft of material) for Engineer/Architect and Manufacturer's Representative inspection of sealant profile.
- B. Repair all random joint sealant "cut out" sections at no cost to Owner.

END OF SECTION 079233

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SECTION 079500 – EXPANSION JOINT ASSEMBLIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. A single installer shall be responsible for providing complete water proofing system including all products specified in the following Sections:
 - 1. Division 07 Section, "Traffic Coatings"
 - 2. Division 07 Section, "Water Repellents"
 - 3. Division 07 Section, "Concrete Joint Sealants"
 - 4. Division 07 Section, "Expansion Joint Assemblies"
- B. This Section includes the following:
 - 1. Standard expansion joint systems:
 - a. Adhered extruded rubber joint system
 - b. Impregnated-foam hybrid expansion joint system.
- C. Related Sections: The following Sections contain requirements that relate to this section:
 - 1. Division 03 Section "Cast-in-Place Concrete".
 - 2. Division 07 Section "Concrete Joint Sealants" for liquid-applied joint sealants.
 - 3. Division 09 Section "Pavement Markings".

1.3 DEFINITIONS

- A. Maximum Joint Width: Widest linear gap a joint system tolerates and in which it performs its designed function without damaging its functional capabilities.
- B. Minimum Joint Width: Narrowest linear gap a joint system tolerates and in which it performs its designed function without damaging its functional capabilities.
- C. Movement Capability: Value obtained from the difference between widest and narrowest widths of a joint opening typically expressed in numerical values (mm or inches) or a percentage (plus or minus) of nominal value of joint width. Movement

capability is to include anticipated movements from concrete shrinkage, concrete shortening and creep from post-tensioning or prestressing, cyclic thermal movements, and seismic movements.

- D. Nominal Joint Width: Width of linear opening specified in practice and in which joint system is installed.
- E. Nominal Form Width: Linear gap in joint system at time of forming or erection of structural elements bounding the expansion joint.
- F. Service Load Level: Defined level of load under which joint assembly remains elastic and fully functional.
- G. Fatigue Load Level: Defined level of load under which joint assembly remains elastic and fully functional, including all noise mitigation components, for the stated number of cycles.
- H. Collapse Load Level: Defined level of load under which joint assembly remains capable of bridging the gap, although plates may yield and components may break.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. General:
 - a. Coordinate and furnish anchorages, setting drawings, and instructions for installing joint systems. Provide fasteners of metal, type, and size to suit type of construction indicated and to provide for secure attachment of joint systems.
 - b. Coordinate requirements for transitions, tolerances, levelness, and plumbness to ensure the installed expansion joint system can perform with expected movement capabilities.
 - c. Coordinate and assign responsibility for preparation of concrete surfaces adjacent to expansion joints.
 - d. Expansion joint surface areas each side of joint gap shall have a vertical differential less than $\frac{1}{4}$ " and meet requirements of expansion joint manufacturer.
 - e. Minor surface defects shall be repaired according to manufacturer's recommendations. Repair materials shall be compatible with intended system materials and shall be approved by the Engineer prior to surface preparation and installation.
 - f. Submit for approval repair products and procedures for all major defects. Repair description shall indicate materials, manufacturer's requirements, expected service life, and maintenance requirements. Take all precautions necessary to avoid damaging adjacent surfaces and embedded reinforcement or post tensioned anchors and tendons. Contractor is responsible for any damages. Concrete repairs shall be of rectangular

configuration, with no feather-edged surfaces. Final surface preparation of all repairs shall be sandblasting, or approved equivalent.

- g. Coordinate layout of joint system and approval of methods for providing joints.

2. Joint Opening Width:

- a. Use temperature adjustment table to properly size joint gap at time of concrete pour and show that proposed joint system is capable of equal individual and combined movements in each direction when installed at designated temperature shown on drawings.
- b. Where installation temperature is other than specified temperature, perform calculations showing joint is capable of movement within design temperature range (Criteria on Drawings) for “other” temperature, and that design and installation follow manufacturer’s recommendations.
- c. Expansion joint movement capability and the actual joint gap movement may not coincide. Construct actual joint gap in accordance with expansion design criteria.

3. Blockouts:

- a. Float expansion joint blockouts to remove all air pockets, voids and spalls caused by form work.
- b. Blockouts shall be plumb with maximum tolerance per Manufacturer or not more than 0.125 inches deviation in 12 inches. Noncompliant blockouts shall be considered major defects.
- c. Blockouts shall be straight and true with maximum tolerance per Manufacturer or not more than 0.250 inches deviation in 10 lineal feet. Noncompliant blockouts shall be considered major defects.

B. Make submittals in accordance with requirements of Division 01 Section, “Submittal Procedures:”

- 1. See requirements of Division 01 Section, “Submittal Procedures,” Part 1 heading, “Submittal Procedures,” for limits to resubmittals.
- 2. See requirements of Division 01 Section, “Submittal Procedures,” Part 2 heading, “Requests for Information,” for RFI constraints.

C. Submittals and Resubmittals: Engineer will review each of Contractor’s shop drawings and/or submittal data the initial time and, should resubmittal be required, one additional time to verify that reasons for resubmittal have been addressed by Contractor and corrections made. Resubmittal changes/revisions/corrections shall be circled. Engineer will review only circled items and will not be responsible for non-circled changes/revisions/corrections and additions. Should additional resubmittals be required, Contractor shall reimburse Owner for all costs incurred, including the cost of Engineer’s services made necessary to review such additional resubmittals. Owner shall in turn reimburse Engineer.

D. Requests For Information

1. Engineer reserves the right to reject, unprocessed, any Request for Information (RFI) that the Engineer, at its sole discretion, deems frivolous.
2. Engineer reserves the right to reject, unprocessed, any RFI that the Engineer, at its sole discretion, deems already answered in the Contract Documents.
3. RFI process shall not be used for requesting substitutions. Procedures for substitutions are clearly specified elsewhere in the contract documents.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product indicated:

1. Construction details, material descriptions, dimensions, and finishes.
2. Proposed method of preparation of concrete surface to receive expansion joint systems.
3. Proposed method and details for treatment of cracks, bugholes, or other potential concrete surface defects in areas to receive expansion joint systems.
4. Horizontal spacing between embedded metals and plates to allow for volume change due to thermal conditions.
5. Temperature adjustment table showing formed gap at the time of concrete placement calculated at 10°F increments and a calculation showing joint system is capable of movement within the design temperature range.

B. Shop Drawings: For each type of product indicated:

1. Placement Drawings: Show project conditions including, but not limited to, line diagrams showing plans, elevations, sections, details, splices, blockout requirement, and terminations. Provide isometric or clearly detailed drawings depicting how components interconnect. Include reviewed and approved details from others whose work is related. Other information required to define joint placement or installation.

1.6 INFORMATIONAL SUBMITTALS

A. Certificates

1. Certification that products and installation comply with applicable federal, state of Maine, and local EPA, OSHA and VOC requirements regarding health and safety hazards.
2. ADA Certification: Prior to installation, submit written certification from manufacturer indicating that expansion joints conform to Americans with Disabilities Accessibility Guidelines for Buildings and Facilities, as published by U.S. Architectural & Transportation Barriers Compliance Board, 1331 F Street, N.W., Suite 1000, Washington, DC 20004-1111. 1-800-872-2253.
 - a. Submit test reports from accredited laboratory attesting to joint systems' movement capability and ADA compliance.

- b. Static coefficient of friction shall meet minimum requirements of Americans with Disabilities Act (ADA).
- 3. Signed statement from installer/applicator certifying that installer/applicator has read, understood, and shall comply with all requirements of this Section.
- 4. Signed statement from manufacturer's representative that they have read, understood, and shall comply with all requirements of this section.
- B. Field Quality Control
 - 1. Two copies each of manufacturer's technical representative's log for each visit.
- C. Qualification Statements
 - 1. Manufacturer's qualifications as defined in the "Quality Assurance" article within 60 days of project award.
 - 2. Installer's qualifications as defined in the "Quality Assurance" article.
 - 3. Evidence of manufacturer's certification of installer/applicator. Evidence shall include complete copy of manufacturer's licensing/certification document, spelling out repair responsibility for warranty claims.

1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Contracts: 2 copies of Maintenance Program contracts.
- B. Operation and Maintenance Data
 - 1. Maintenance Manual: 3 copies of System Maintenance Manual.
 - 2. Five copies of snow removal guidelines for areas covered by warranty.
- C. Warranty Documentation: 2 executed copies of Labor and Material Warranty including all terms, conditions and maintenance requirements.

1.8 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Owner retains right to reject any manufacturer.
- B. Installer Qualifications: An employer of workers, including superintendent for this project, trained and approved by manufacturer.
- C. Certifications
 - 1. Provide reports to Owner detailing maintenance activities have been performed in accordance with written maintenance agreement for expansion joints.
 - 2. Materials shall be compatible with materials or related Work with which they come into contact and the related materials sections.
 - 3. Manufacturer/Applicator: Review and approve all details before construction. Confirm in writing to Owner.

1.9 DELIVERY, STORAGE AND HANDLING

- A. Deliver all materials to site in original, unopened containers, bearing following information:
 - 1. Name of product.
 - 2. Name of manufacturer.
 - 3. Date of preparation.
 - 4. Lot or batch number.
- B. Store materials under cover and protect from weather. Replace packages or materials showing any signs of damage with new material at no additional cost to Owner.

1.10 WARRANTY

- A. Warranty period shall be a **5** year labor and materials warranty commencing with date of acceptance of work.
- B. Installation Requirements: Include a written plan of construction and coordination requirements, to allow joint system installation to proceed with specified warranty, that specifically addresses the following:
 - 1. Block out acceptance criteria.
 - 2. Surface preparation acceptance criteria.
 - 3. Crack, surface defect, and detailing recommendations.
 - 4. Method of protection of surrounding surfaces.
 - 5. Method of expansion joint system installation description.
 - 6. Primer type and application rate.
 - 7. Method of preparation of all glands and reinforced membranes.
 - 8. Temperature, humidity and other weather constraints. Specify substrate moisture testing criteria, if any.
 - 9. Final cure time before removal of protection, resumption of traffic, and/or paint striping.
 - 10. Any other special instructions required to ensure proper installation.
- C. Quality Service Requirements: Show evidence of licensed/approved installer. List of names, addresses and phone numbers, with copies of certification/approval agreement with each, satisfies requirement. Licensing/certification agreement shall include following information:
 - 1. Installer's financial responsibility for warranty burden under agreement terms.
 - 2. Manufacturer's financial responsibility for warranty burden under agreement terms.
 - 3. Process for dispute settlement between manufacturer and installer in case of system failures where cause is not evident or cannot be assigned.
 - 4. Authorized signatures for both Installer Company and Manufacturer.
 - 5. Commencement date of agreement and expiration date (if applicable).
 - 6. Provide copy of contractor's field application quality control procedures.

- D. Warranty shall be jointly executed by Manufacturer and Installer for labor and materials. Detail responsibilities of General Contractor, manufacturer and installer with regard to warranty requirements, as outlined in the Manufacturer's warranty and related Licensing/Certification documents. Warranty shall provide that system shall be free of defects, water penetration and chemical damage related to system design, workmanship or material deficiency, consisting of:
1. Any water leakage through expansion joint system or leaking conditions of reinforced membrane, other waterproofing components, or glands.
 2. Any adhesive or cohesive failures of the system.
 3. Shifting of plates out of alignment due to system failure.
 4. Loose plates, anchor blocks, bolts.
 5. Metal to metal vibration causing noises during use.
 6. Metal to non-metal vibration causing noises during use.
 7. Tears, weathering, or degradation in gland from normal use.
 8. Expansion joint glands are considered defective if they buckle upwards beyond the level of the floor surface after installation or downward in excess of ½ inch below the floor surface.
- E. If expansion joint systems or components show any of defects listed above, supply labor and material to repair all defects at no cost to Owner.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. A single Installer shall be responsible for providing complete expansion joint system. Obtain all joint systems through one source from a single manufacturer.
- B. Drawings indicate size, profiles, and dimensional requirements of joint systems and are schematic for systems indicated.
- C. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

2.2 PERFORMANCE REQUIREMENTS

- A. Intent of this section is to insure that installed expansion joints allow pedestrian and vehicular traffic to pass in a smooth, quiet fashion with minimal maintenance required over a period of not less than 10 years. Expansion joints shall not only function as structural bridging elements, but must also accommodate structural expansions/contractions and minimize water leakage.
- B. Provide design of expansion joint for preparation of final details for fabrication and construction of all concrete openings, expansion joint elements and required accessories. An integral part of this project is engineering for the following:

1. Include calculations for the size and forming of concrete openings to provide nominal joint width as indicated on drawings. Provide a summary of the design criteria used in the design.
 2. Include calculations for the appropriate size of expansion joint elements in accordance with the expansion joint assembly performance criteria. Include installation requirements of expansion joint assembly for specific project conditions and scheduling. Provide a summary of design criteria used in design.
- C. Expansion joint design shall meet or exceed all expected movements shown on drawings.
- D. Installation temperature range and estimated volume change movements are shown on drawings. Nominal form width shown on the drawings shall be adjusted for the ambient temperature at time of concrete placement and designer shall verify that width of joint at installation shall meet minimum installation requirements.
- E. Expansion joint systems shall be capable of resisting a differential vertical movement of ½ inch.
- F. Materials shall be supplied in lengths to minimize or eliminate the need to splice waterproofing components.
1. Waterproofing materials directly exposed to vehicular traffic shall be supplied with no joints in vehicle drive aisles.
 2. All mitered splices shall be performed at the factory and provide sufficient gland length for butt splicing with field splicing equipment.
 3. All Santoprene butt to butt splices shall be heat welded.
 4. Butt to butt splices with other materials shall be per manufacturer's recommendations.
- G. Design system for passenger vehicles traveling at speeds normally expected within a parking structure.
- H. Design system for passenger vehicles traveling at speeds higher than those expected in a parking structure.
- I. Walking Surfaces: Expansion joint assemblies at walking areas subject to pedestrian traffic shall provide a smooth, slip resistant walking surface for pedestrians with these minimum requirements:
1. Shall provide walking surfaces in accordance with ASTM – F 1637 Standard Practice for Safe Walking Surfaces.
 2. Shall be designed to comply with "Americans with Disabilities Act (ADA), Accessibility Guidelines (ADAAG)". Americans with Disabilities Accessibility Guidelines for Buildings and Facilities, as published by U.S. Architectural & Transportation Barriers Compliance Board, 1331 F Street, N.W., Suite 1000, Washington, DC 20004-1111. 1-800-872-2253.
 3. Adjoining walkway surfaces shall be flush and meet the following minimum requirements:

- a. Changes in level of less than $\frac{1}{4}$ inch in height may be without edge treatment as shown in ADA Figure 303.2 and on the Drawings.
- b. Changes in Level between $\frac{1}{4}$ inch and $\frac{1}{2}$ inch in height shall be beveled with a slope no greater than 1:2 as shown in ADA Figure 303.3 and on the Drawings.
- c. Changes in level greater than $\frac{1}{2}$ inch in height are not permitted unless they can be transitioned by means of a ramp as shown on Drawings.
- d. Openings in floor or ground surfaces shall not allow passage of a sphere more than $\frac{1}{2}$ inch diameter except as allowed for elevators and platform lifts as shown in ADA Figure 302.3 and on the Drawings.

2.3 MANUFACTURERS

- A. Subject to compliance with requirements, provide products from one of following manufacturers (listed in alphabetical order), only where specifically named in product categories:
 1. Emseal Joint Systems, Westborough, MA (Emseal).
 2. Tremco, Cleveland, OH (Tremco).
 3. Watson Bowman Acme Corporation, a Division of BASF Construction Chemicals NA, Amherst, NY (WBA).

2.4 PRODUCTS, STANDARD EXPANSION JOINT SYSTEMS

- A. Adhered extruded rubber expansion joint sealant system.
 1. C/S Hybrid Compression Seal, Model HB, C/S.
 2. Cebreg System, J or JP Series, EMS.
 3. Jeene[®] Structural Sealing Joint System, WBA.
- B. Impregnated-foam hybrid expansion joint system.
 1. DSM System, Emseal.
- C. Substitutions: **None** for this project. Contact Engineer/Architect for consideration for future projects.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces and blockouts where expansion joint systems will be installed for installation tolerances and other conditions affecting performance of Work.
- B. Check elevations on each side of expansion joint gap to ensure flush slab-to-slab transition.

- C. Check anticipated or actual minimum and maximum joint openings. Compare to manufacturer's movement specifications and make joint sizing recommendations.
- D. Coordinate and verify that related Work meets following requirements:
 - 1. Check adhesion to substrates and recommend appropriate preparatory measures.
 - 2. Curing compounds used on concrete surfaces are compatible with Work to be installed.
 - 3. Concrete surfaces have completed proper curing period for system selected.
 - 4. Coordinate expansion joint system with other related Work before installation of expansion joint.
 - 5. Verify expansion joints are compatible with Joint Sealants and traffic toppings.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.
- F. Cease installation if expansion joint blockouts and/or openings exhibit cracked edges, voids or spalls. Repair with approved material prior to installation of expansion joint.
- G. Correct unsatisfactory conditions in manner acceptable to Manufacturer and Engineer before installing joint system.

3.2 PREPARATION

- A. Prepare for installation of expansion joint systems in accordance with manufacturer's recommendations
- B. Surface Preparation:
 - 1. Acid etching: Prohibited.
 - 2. Prepare substrates according to joint system manufacturer's written instructions.
 - 3. Clean joints thoroughly in accordance with manufacturer's instructions to remove all laitance, unsound concrete and curing compounds which may interfere with adhesion.

3.3 INSTALLATION

- A. Comply with manufacturer's written instructions for storing, handling, and installing joint assemblies and materials unless more stringent requirements are indicated.
- B. Proceed with work only when existing and forecast weather and temperature of concrete substrate will permit work in accordance with manufacturer's recommendations.
- C. Cease material installation under adverse weather conditions, or when temperatures are outside manufacturers recommended limitations for installation, or when temperature of work area or substrate are below 40°F.

- D. Terminate exposed ends of joint assemblies with field- or factory-fabricated termination devices.
- E. Seal all openings to occupied spaces to prevent cleaning materials, solvents and fumes from infiltration. All protective measures and/or ventilating systems required to prevent infiltration are incidental to this Work.
- F. Clean off excess material and material smears adjacent to joints as work progresses using methods and materials approved by manufacturer.

3.4 FIELD QUALITY CONTROL

- A. Manufacturer Services: Provide qualified manufacturer's technical representative for periodic inspection of Work at critical time of the installation, including but not limited to pre-concrete formwork and placement site meetings, block out inspection, surface defect repair, surface preparation, expansion gland installation and waterproofing system installation.

3.5 PROTECTION

- A. Do not remove protective covering until finish work in adjacent areas is complete. When protective covering is removed, clean exposed metal surfaces to comply with manufacturer's written instructions.
- B. Protect installation from damage by work of other Sections. Where necessary due to heavy construction traffic, remove and properly store cover plates or seals and install temporary protection over joints. Reinstall cover plates or seals prior to Substantial Completion of Work.

3.6 MAINTENANCE

- A. Provide separate line item bid price for 5 year maintenance program for vehicle rated seismic expansion joint system. The Maintenance Program includes observations, reports, and maintenance of all components for seismic expansion joint system.

END OF SECTION 079500

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SECTION 099120 - PAVEMENT MARKING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Contract Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections apply to this Section.

1.2 SUMMARY

- A. This Section includes surface preparation and application of paint systems for the high build, two coat systems for the items of types, patterns, sizes, and colors described in this article.
- B. Provide the following systems as shown on Drawings:
 - 1. Parking Stall Stripes.
 - 2. Traffic Arrows, crosswalks, accessible stall access aisles, walkways, symbols, stop bars, words and other markings.
 - 3. International Symbol of Accessibility.
- C. Provide painting of curbs and curb ramps as described in the following paragraphs:
 - 1. Paint vertical surface and the first 6 in. of the abutting horizontal surface at the top of all curbs and islands including equipment islands within parking facility except those which do not exceed 3'0" in width and abut a wall, spandrel panel, bumper wall guardrail or other construction (not including landscaping or equipment) which prevents passage of pedestrians.
 - 2. In parking areas and sidewalks within the project limits or constructed as part of this project, paint curb ramps (including flares), curb returns at curb ramps and any projecting elements at edges of accessible ramps without handrails. Paint curb returns at driveways and paint curb minimum of 3 ft either side of curb ramp or driveway, (or curb ramp flare length, whichever is greater) in accordance with Pavement Marking.
 - 3. Paint color for curbs and curb ramps shall be yellow.
- D. Proportion International Symbol of Accessibility in accordance with ICC A117.1-2009 Accessible and Usable Buildings or 2010 ADA Standards for Accessible Design.
- E. Related Work:
 - 1. Pavement Marking Contractor shall verify compatibility with sealers, joint sealants, caulking and all other surface treatments as specified in Division 07.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Provide product data as follows:
 - 1. Manufacturer's certification that the material complies with standards referenced within this Section.
 - 2. Intended paint use.
 - 3. Pigment type and content.
 - 4. Vehicle type and content.
- C. Submit list of similar projects (minimum of 5) where pavement-marking paint has been in use for a period of not less than 2 yrs.
- D. See requirements of Division 01 Section, "Submittal Procedures," Part 1 heading, "Submittal Procedures," for limits to resubmittals.
- E. See requirements of Division 01 Section, "Submittal Procedures," Part 2 heading, "Requests for Information," for RFI constraints.

1.4 PROJECT CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 degrees F.
- B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 degrees F above the dew point; or to damp or wet surfaces.

1.5 QUALITY ASSURANCE

- A. Provide written 1 year warranty to Owner that pavement markings will be free of defects due to workmanship, inadequate surface preparation, and materials including, but not limited to, fading and/or loss of markings due to abrasion, peeling, bubbling and/or delamination. Excessive delamination, peeling, bubbling or abrasion loss shall be defined as more than 15% loss of marking material within one year of substantial completion and/or occupancy of the parking area. With no additional cost to Owner, repair and/or recoat all pavement marking where defects develop or appear during warranty period and all damage to other Work due to such defects.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Pavement marking materials shall meet Federal, State and Local environmental standards.
- B. Paint shall be manufactured and formulated from first grade raw materials and shall be free from defects or imperfections that might adversely affect product serviceability.
- C. Paints shall comply with the National Organic Compound Emission Standards for Architectural Coatings, Environmental Protection Agency, 40 CFR Part 59.
- D. The product shall not contain mercury, lead, hexavalent chromium, or halogenated solvents.

2.2 PAVEMENT MARKING PAINTS:

- A. Epoxy paint may be used for all markings, unless noted otherwise on the Drawings. Paint shall be a two-component system consisting of minimum 99 percent solids. The material shall be specifically formulated as a pavement marking material and shall be spray applied at ambient temperatures.
 - 1. The specific paint formulation shall be approved for use on highways by the state and/or local DOT where the project is located.
- B. Solvent based paint may be employed for white and yellow pavement markings and shall meet the requirements of MPI #32
- C. 100% acrylic waterborne - paint shall be used for white and yellow pavement markings and shall meet requirements of MPI #70.
 - 1. All products shall have performance requirements of Type I and II of Federal Standard TT-P-1952E.
 - 2. 100% acrylic waterborne paint for special color pavement markings (blue, green, red, black) shall meet requirements of Federal Specification TT-P-1952E. Special color marking materials shall be compatible with the white and yellow pavement markings where they are layered.

2.3 COLOR OF PAINT

- A. Color of paint, unless noted otherwise on Contract Drawings, shall be yellow and shall match federal color chip No. 33538. Color shall have daylight directional reflectance (without glass beads) of not less than 50% (relative to magnesium oxide) when tested in accordance with Federal Test Method Standard 141, Method 6121.
- B. Paint color for traffic yellow, where shown on Contract Drawings or specified herein, shall match federal color chip No. 33538 commonly referred to as federal highway yellow. Color shall have daylight directional reflectance (without glass beads) of not

less than 50% (relative to magnesium oxide) when tested in accordance with Federal Test Method Standard 141, Method 6121.

- C. Paint color for blue accessible parking space pavement markings, if shown on Contract Drawings, shall match federal color chip No. 35180. Color shall have daylight directional reflectance (without glass beads) of not less than 52% (relative to magnesium oxide) when tested in accordance with Federal Test Method Standard 141, Method 6121.

2.4 BEADS

- A. Use Glass Beads (Spheres) in all pavement markings except stall striping lines. Conform to Federal Specification TT-B-1325D, Type I. Broadcast beads into markings at rate not less than 6 lbs. per gallon of paint.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.
- B. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- C. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
 - 1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.
- D. Striping shall not be placed until full cure of concrete slab and sealer. Concrete surfaces generally require 30 to 90 days @ 70°F or higher. Sealers (other than silane) generally require 14 days @ 70°F or higher. Silane sealers require 24 hrs @ 70°F or higher. Bituminous surfaces generally require 30 days @ 45° F or higher.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- B. Do not paint or finish any surface that is wet or damp.

- C. Clean substrates of substances that could impair bond of paints, including dirt, dust, oil, grease, and incompatible paints and encapsulants.
- D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- E. Lay out all striping on each tier, using dimensions and details shown on Contract Drawings, before painting that tier. Report any discrepancies, interferences or changes in striping due to field conditions to Engineer/Architect prior to painting. Pavement Marking Contractor shall be required to remove paint, repair surface treatment and repaint stripes not applied in strict accordance with Contract Drawings.
- F. Where existing painted pavement markings and/or stripes conflict with new striping layout or must be removed due to installation which does not conform to contract requirements, remove existing paint markings, using care to avoid scarring substrate surface.
 - 1. Concrete surfaces: Material shall be removed by methods acceptable to Engineer/Architect and cause as little damage as possible to surface texture of pavement. Methods, that can provide acceptable results, are grinding and air or shot blasting. Use of chemicals to remove pavement markings prohibited. Collect residue generated by removal of pavement markings and dispose of as required by all applicable laws and regulations. If grinding is used, lightly grind floor surface using wheel mounted floor grinder or similar equipment with positive elevation control of grinder head. For all removal techniques: On test area, demonstrate to Owner acceptable removal of paint material and control of paint removal equipment to prevent substrate scarring.
 - 2. Traffic Topping/Membrane surfaces: Remove existing pavement markings by solvent washing or high-pressure water washing. Submit letter from traffic topping/membrane manufacturer certifying that solvents and/or water pressures are acceptable for this use and will not damage material. On test area, demonstrate to Owner acceptable removal of paint material and control of paint removal equipment to prevent substrate scarring.
 - 3. Contractor shall not use paint, bituminous bond coat or other methods of covering markings to obliterate existing pavement markings.
 - 4. Material deposited on pavement as a result of removal shall be removed as work progresses. Accumulation of material, that might interfere with drainage or might constitute a hazard to traffic, prohibited.
 - 5. Curing compounds on new concrete surfaces (less than 1 yr old) shall be removed per existing pavement marking removal requirements prior to installation of new pavement markings.
- G. Work Areas:
 - 1. Store, mix and prepare paints only in areas designated by Contractor for that purpose.
 - 2. Provide clean cans and buckets required for mixing paints and for receiving rags and other waste materials associated with painting. Clean buckets regularly. At

close of each day's Work, remove used rags and other waste materials associated with painting.

3. Take precautions to prevent fire in or around painting materials. Provide and maintain appropriate hand fire extinguisher near paint storage and mixing area.

H. Mixing:

1. Do not intermix materials of different character or different manufacturer.
2. Do not thin material except as recommended by manufacturer.

I. Disposal:

1. Contractor shall properly dispose of unused materials and containers in compliance with Federal Resource Conservation Recovery Act (RCRA) of 1976 as amended, and all other applicable laws and regulations.

3.3 APPLICATION

- A. Apply paint in 2-coat system; first coat shall be 50% of total 15 wet mil minimum thickness, not to exceed 8 mils. First coat shall be cured prior to installation of second coat. At Contractor's option, one coat may be applied before substantial completion, with a second coat delayed for 3-6 months until weather conditions are appropriate and the concrete has cured sufficiently for proper adhesion.
1. Two coat system total wet mil thickness of 0.015 in (0.381 mm).
 2. Two coat system total wet mil thickness of 0.018 to 0.025 in (0.457 – 0.635 mm) When Type IVA beads are used.
 3. Two coat system total wet mil thickness of 0.015 to 0.018 in (0.381 – 0.457 mm) When Type IVB beads are used.
- B. Apply painting and finishing materials in accordance with manufacturer's directions. Use applications and techniques best suited for material and surfaces to which applied. Minimum air shall be used to prevent overspray. Temperature during application shall be minimum of 40° F and rising, unless manufacturer requires higher minimum temperature. Maximum relative humidity shall be as required by manufacturer.
- C. Application of beads and/or silica sand shall coincide with application of paint, but shall be done as separate operation by a suitable dispenser. Sand may be premixed with paint for application to curbs only. Glass beads and silica sand shall adhere to the cured paint or all marking operations shall cease until corrections are made.
- D. All lines shall be straight, true, and sharp without fuzzy edges, overspray or non-uniform application. Corners shall be at right angles, unless shown otherwise, with no overlaps. Line width shall be uniform (-0%, +5% from specified width). No excessive humping (more material in middle than at edges or vice versa).

END OF SECTION 099120

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SECTION 220500 - COMMON WORK RESULTS FOR PLUMBING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections apply to this and other Sections of Division 22.
- B. References:
 - 1. American National Standards Institute (ANSI):
 - 2. National Standard Plumbing Code (NAPHCC):
 - 3. American Society for Testing and Materials (ASTM):
 - a. ASTM A74, "Specification for Cast Iron Soil Pipe and Fittings".
 - b. ASTM A120, "Specification for Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Ordinary Use".
 - c. ASTM A234, "Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures".
 - d. ASTM B88, "Specification for Seamless Copper Water Tube".
 - e. ASTM C76, "Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe".
 - f. ASTM C700, "Specification for Extra Strength and Standard Strength Clay Pipe and Perforated Clay Pipe".
 - g. ASTM D3034, "Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings".

1.2 SUMMARY

- A. This Section includes general administrative and procedural requirements for mechanical installations. Following administrative and procedural requirements are included in this Section to expand the requirements specified in Division 01:
 - 1. Submittals.
 - 2. Coordination/Scheduling/Quality Assurance.
 - 3. Record documents.
 - 4. Maintenance manuals.
 - 5. Rough-ins.
 - 6. Mechanical installations.
 - 7. Cutting and patching.
 - 8. Testing/Guarantee
 - 9. Piping materials and installation common to most piping systems.
 - 10. Fittings and Joints.
 - 11. Floor and Trench Drains

12. Back water valves.
13. Cleanouts.
14. Expansion joints for Rain Water Collectors.
15. Valves.
16. Requirements for Equipment Installations.
17. Labeling & Identifying.
18. Touch up painting and finishing.
19. Cutting and patching.

B. Related Sections: Following Sections contain requirements that relate to this Section:

1. The remainder of Division 22, plus general related specifications including:
 - a. Access to mechanical installations.
 - b. Excavation for mechanical installations within the building boundaries, and from building to utilities connections.

C. Definitions:

1. Term "Contractor" used throughout Division 22 shall mean Mechanical Subcontractor.
2. Term "provide" shall mean to furnish all necessary labor, materials, equipment, accessories, transportation, services, installation and adjustment under Contract amount, including Contractor's profit, overhead and payment of all taxes and fees.

1.3 SUBMITTALS

A. General: Follow the procedures specified in Division 01 Section "Submittal Procedures" and as specified in this Section.

B. Shop Drawings and Catalog Sheets. Include:

1. Plumbing line layout.
2. Floor drains.
3. Cleanouts.
4. Expansion joints for plumbing lines.
5. Plumbing fixtures.
6. Back flow preventers.
7. Standpipe fire line layout and components.
8. PIV Valves.
9. Support material and hardware.

C. Substitutions:

1. Products are referenced in Specification and on Drawings to establish standard of quality, style, design, and function of materials, equipment, apparatus, or product.

2. There are often several satisfactory substitutes for standardized utilitarian items which satisfy design objectives.
3. Since it is impractical to name all possible brands that might be furnished, substitutes may be proposed unless specifically stated otherwise.
4. Submit substitutions in accordance with Division 01 and General Conditions of Specification and as follows:
 - a. Submit proposed substitute material or equipment to be considered for approval as equivalent to Engineer at least 7 days before time set for receiving Bids.
 - b. Contractor assumes all engineering and construction costs necessary for revision in Work due to substitute material or equipment.
- D. See requirements of Division 01 Section, "Submittal Procedures," Part 1 heading, "Submittal Procedures," for limits to resubmittals.
- E. See requirements of Division 01 Section, "Submittal Procedures," Part 2 heading, "Requests for Information," for RFI constraints.

1.4 COORDINATION

1. Visit site before Bidding to note apparent features which may affect Work. No subsequent allowance will be made because of failure to make this examination before Bidding.
2. Verify all dimensions in field before ordering any material or doing any Work.
3. Verify ceiling heights or other architectural and structural details before installing any piping.
4. No extra compensation will be allowed because of differences between actual measurements and dimensions and those indicated on Drawings.
5. Notify Engineer in writing of any difference which may be found before proceeding with Work.

1.5 SEQUENCING AND SCHEDULING

1. Coordinate mechanical equipment installation with other building components.
2. Arrange for chases, slots, and openings in building structure during progress of construction to allow for mechanical installations.
3. Coordinate the installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.
4. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work. Coordinate installation of large equipment requiring positioning prior to closing in the building.
5. Coordinate connection of electrical services.
6. Coordinate connection of mechanical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies.

7. Coordinate requirements for access panels and doors where mechanical items requiring access are concealed behind finished surfaces. Access panels and doors are specified in Division 08 Section "Access Doors and Panels".
8. Schedule Work so as to coordinate with other Contractors.
9. Before starting Work, prepare and submit to Prime Contractor schedule of operations outlining proposed order of procedure, giving dates of execution and estimated time required for completion of each step.
10. After schedule has been accepted by Prime Contractor and Engineer, do not deviate from schedule without written consent of Prime Contractor.
11. No subsequent extras will be allowed for materials and labor not included by Bidder for Mechanical Work due to lack of familiarity with Contract Documents as they relate to Work of all other trades required for Project.
12. Before construction starts, cut off and plug any abandoned existing services at property line. Coordinate with local utility company and civil engineer.
13. Coordinate service connection to meter with local water department and civil engineer.

1.6 QUALITY ASSURANCE

- A. Qualify welding processes and operators for structural steel according to AWS D1.1 "Structural Welding Code--Steel".
- B. Qualify welding processes and operators for piping according to ASME "Boiler and Pressure Vessel Code", Section IX, "Welding and Brazing Qualifications".
 1. Comply with provisions of ASME B31 Series "Code for Pressure Piping".
 2. Certify that each welder has passed AWS qualification tests for the welding processes involved and that certification is current.
- C. ASME A13.1 for lettering size, length of color field, colors, and viewing angles of identification devices.
- D. Equipment Selection: Equipment of greater or larger power, dimensions, capacities, and ratings may be furnished provided such proposed equipment is approved in writing and connecting mechanical and electrical services, circuit breakers, conduit, motors, bases, and equipment spaces are increased. No additional costs will be approved for these increases, if larger equipment is approved. If minimum energy ratings or efficiencies of the equipment are specified, the equipment must meet the design requirements and commissioning requirements.

1.7 CODES AND STANDARDS

1. Comply with:
 - a. American Welding Society (AWS).
 - b. American Society of Mechanical Engineers (ASME).
 - c. American National Standards Institute (ANSI).
 - d. American Society for Testing and Materials (ASTM).

- e. American Insurance Association (A.I.A.).
 - f. National Fire Protection Association (NFPA).
 - g. Underwriters' Laboratories, Inc. (UL).
 - h. Manufacturer's Standardization Society of the Valve & Fittings Industry, Inc. (MSS).
 - i. Factory Mutual Research Corp. (FM).
 - j. Sheet Metal and Air Conditioning Contractors National Association (SMACNA)
 - k. American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE)
2. All local, state, and federal rules and regulations.
- a. International Building Code (IBC):
 - 1) IBC International Building Code.
 - 2) IBC International Mechanical Code.
 - 3) IBC International Plumbing Code.
 - 4) IBC International Fire Prevention Code.
 - b. Building Officials and Code Administrators, International, Inc. (BOCA):
 - 1) The BOCA National Building Code.
 - 2) The BOCA National Mechanical Code.
 - 3) The BOCA National Plumbing Code.
 - 4) The BOCA National Fire Prevention Code.
 - c. Southern Building Code Congress International, Inc. (SBCCI):
 - 1) The SBCCI Standard Building Code.
 - 2) The SBCCI Standard Mechanical Code.
 - 3) The SBCCI Standard Plumbing Code.
 - 4) The SBCCI Standard Fire Prevention Code.
 - d. Uniform Building Code (UBC):
 - 1) The UBC Uniform Building Code.
 - 2) The UBC Uniform Mechanical Code.
 - 3) The UBC Uniform Plumbing Code.
 - 4) The UBC Uniform Fire Code.
3. Should any change in Drawings and Specifications be required to comply with local regulations, notify Engineer at least 7 days before time set for receiving Bids. After entering into contract, Contractor will be held to complete all Work necessary to meet local requirements without extra expense to Owner.
4. Maintain a competent superintendent at Project throughout progress of Work and until Work is completed.

1.8 RECORD DOCUMENTS

- A. Prepare record documents in accordance with the requirements in Division 01 Section "Closeout Procedures". In addition to the requirements specified in Division 01, indicate the following installed conditions:
 - 1. Mains and branches of piping systems, with valves and control devices located and numbered, concealed unions located, and with items requiring maintenance located (i.e., traps, strainers, expansion compensators, tanks, etc.). Valve location diagrams, complete with valve tag chart. Indicate actual inverts and horizontal locations of underground piping.
 - 2. Equipment locations (exposed and concealed), dimensioned from prominent building lines.
 - 3. Approved substitutions, contract modifications, and actual equipment and materials installed.
 - 4. Contract modifications, actual equipment and materials installed.
- B. Engage the services of a Land Surveyor or Professional Engineer registered in the state in which the project is located as specified in Division 01 Section "Execution Requirements" to record the locations and invert elevations of underground installations.

1.9 MAINTENANCE MANUALS

- A. Prepare maintenance manuals in accordance with Division 01 Section "Closeout Procedures" In addition to the requirements specified in Division 01, include the following information for equipment items:
 - 1. Description of function, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and commercial numbers of replacement parts.
 - 2. Manufacturer's printed operating procedures to include start-up, break-in, and routine and normal operating instructions; regulation, control, stopping, shutdown, and emergency instructions; and summer and winter operating instructions.
 - 3. Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly, repair, and reassembly; aligning and adjusting instructions.
 - 4. Servicing instructions and lubrication charts and schedules.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to the project properly identified with names, model numbers, types, grades, compliance labels, and other information needed for identification.
- B. Deliver materials to Project in good condition. Store materials off ground and protected from elements.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 ROUGH-IN

- A. Verify final locations for rough-ins with field measurements and with the requirements of the actual equipment to be connected.
- B. Refer to equipment specifications in Divisions 02 through 33 for rough-in requirements.
- C. Drawings are generally diagrammatic and indicative of Work to be installed.
- D. Do not scale Drawings for rough-in Work.

3.2 MECHANICAL INSTALLATIONS

- A. General: Sequence, coordinate, and integrate the various elements of mechanical systems, materials, and equipment. Comply with the following requirements:
 - 1. Coordinate mechanical systems, equipment, and materials installation with other building components so as not to delay Contractors.
 - 2. Verify all dimensions by field measurements.
 - 3. Arrange for chases, slots, and openings in other building components during progress of construction, to allow for mechanical installations.
 - 4. Coordinate the installation of required supporting devices and sleeves to be set in poured-in-place concrete and other structural components, as they are constructed.
 - 5. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work. Give particular attention to large equipment requiring positioning prior to closing in the building.
 - 6. Where mounting heights are not detailed or dimensioned, install systems, materials, and equipment to provide the maximum headroom possible.
 - 7. Coordinate connection of mechanical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies. Provide required connection for each service.
 - 8. Install systems, materials, and equipment to conform with approved submittal data to greatest extent possible. Conform to arrangements indicated by the Contract Documents, recognizing that portions of the Work are shown only in diagrammatic form. Where coordination requirements conflict with individual system requirements, refer conflict to the Engineer.
 - 9. Install systems, materials, and equipment level and plumb, parallel and perpendicular to other building systems and components, where installed exposed in finished spaces.
 - 10. Install mechanical equipment to facilitate servicing, maintenance, and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations. Extend grease fittings to an accessible location.

11. Install access panel or doors where units are concealed behind finished surfaces. Access panels and doors are specified in Division 08 Section "Access Doors and Frames" and this section.
12. Install systems, materials, and equipment giving right-of-way priority to systems required to be installed at a specified slope.
13. Install piping to occupy minimum of space. Install parallel and close to walls, ceiling, columns or other members providing proper space for covering or removal of pipes.
14. Coordinate Work to avoid interferences with other trades.
15. Due to small scale of Drawings, it is not possible to indicate all offsets, fittings or valves which may be required. Investigate structural and finish conditions affecting this Work. Plan accordingly, furnishing such offsets, fittings and valves as may be required.
16. Where possible, locate all plumbing lines in areas which are out of public view.
17. Review plumbing layout with Engineer before construction.
18. In case of conflict between riser diagram and floor plan, greater quantity or better quality prevails, subject to approval of Engineer.
19. Coordinate all Work specified in this Division with Work of all other trades required for Project.
20. Check Structural Drawings for location of drains, vents and other Mechanical Work. In case of conflict between Structural Drawings and Mechanical Drawings, Structural Drawings take precedence.
21. Notify Engineer immediately and confirm in writing of any conflict between Mechanical and Structural Drawings.
22. Finish painting will be done by others.
23. Any galvanized equipment, material, or hardware that is cut, scratched, field threaded or grooved shall be coated with a Zinc Rich Coating (ZRC or approved equivalent).
24. Trench and backfill in accordance with Division 31 Section "Earth Moving."
25. In case interferences between Work develop, Engineer will decide which Work is to be relocated regardless of which was first installed.
26. Cleanup:
 - a. At completion of Work under this contract, remove from site and dispose of all rubbish and discarded materials and restore disturbed facilities and surfaces.
 - b. Provide entire installation thoroughly free from all oil and grease after successfully completing all tests and before Work is turned over to Owner.

3.3 PIPING SYSTEMS-COMMON REQUIREMENTS

- A. General: Install piping as described below, except where system Sections specify otherwise.
- B. General Locations and Arrangements: Drawings (plans, schematics, and diagrams) indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated.

- C. Install all piping parallel to building walls and column lines at such height for proper drainage and so not to interfere with doorways, stairway or traffic.
- D. Install suspended pipes as close to ceiling as possible and at uniform grade.
- E. Where interferences develop in field, offset or reroute piping as required to clear such interferences. Use proper fittings, no bent pipe is permitted.
- F. Install full-time water lines in areas not subject to freezing within building and below frost line and minimum of 36 in. below grade outside building.
- G. Install water meter and backflow preventor in protected area not subject to freezing.
- H. Use small amount of prepared, pipe thread lubricant on outside threads.
- I. Work pipe into place without springing
- J. Install all piping such that it will drain and vent as shown or required.
- K. Provide uniform grade to all horizontal pipes and provide drains at all low points in water piping system.
- L. Cast-in-Place Insert Installation: Before placement of concrete, furnish, locate and set on forms, cast-in-place inserts which support Mechanical Work.
- M. Furnish hot dipped galvanized steel pipe sleeves extended one inch above finished floor line for all pipe running through floors.
- N. Install piping at indicated slope.
- O. Install components having pressure rating equal to or greater than system operating pressure.
- P. Install piping free of sags and bends and neat in appearance.
- Q. Install couplings according to manufacturer's printed instructions.
- R. Below Grade, Exterior Wall, Pipe Penetrations: Install cast-iron wall pipes for sleeves. Seal pipe penetrations using mechanical sleeve seals. Size sleeve for 1-in. (25mm) annular clear space between pipe and sleeve for installation of mechanical seals.
- S. Fire Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestopping sealant material. Firestopping materials are specified in Division 07 Section "Penetration Firestopping".
- T. Verify final equipment locations for roughing in.
- U. Refer to equipment specifications in other Sections for roughing-in requirements.
- V. Piping Joint Construction: Join pipe and fittings as follows and as specifically required in individual piping system Sections.

1. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
2. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
3. Soldered Joints: Construct joints according to AWS "Soldering Manual", Chapter 22 "The Soldering of Pipe and Tube".
4. Brazed Joints: Construct joints according to AWS "Brazing Manual" in the "Pipe and Tube" Chapter.
5. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full inside diameter. Join pipe fittings and valves as follows:
 - a. Note the internal length of threads in fittings or valve ends, and proximity of internal seat or wall, to determine how far pipe should be threaded into joint.
 - b. Apply appropriate tape or thread compound to external pipe threads (except where dry seal threading is specified).
 - c. Align threads at point of assembly.
 - d. Tighten joint with wrench. Apply wrench to valve end into which pipe is being threaded.
 - e. Damaged Threads: Do not use pipe or pipe fittings having threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

W. All piping routed over finished areas must be insulated.

3.4 EQUIPMENT INSTALLATION--COMMON REQUIREMENTS

- A. Install equipment to provide the maximum possible headroom where mounting heights are not indicated.
- B. Install equipment according to approved submittal data. Portions of the Work are shown only in diagrammatic form. Refer conflicts to Engineer.
- C. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, except where otherwise indicated.
- D. Install mechanical equipment to facilitate servicing, maintenance, and repair or replacement of equipment components. Connect equipment for ease of disconnecting, with minimum of interference with other installations. Extend grease fittings to an accessible location. Provide unions to facilitate equipment replacement.
- E. Install equipment giving right-of-way to piping systems installed at a required slope.
- F. Provide 4 inch high concrete housekeeping pad with rounded edges under all floor mounted equipment where clearance allows.

- G. Fasteners and Anchors: Hot dipped galvanized or stainless steel, type, grade, and class as required. Mounting holes for all fasteners must be drilled. The use of powder, gas, or other types of power propelled fasteners is prohibited.

3.5 HANGER AND SUPPORT INSTALLATION:

- A. Support piping in building on standard clevis type (MSS SP-69, No. 1) hangers, with adjustable rods.
- B. Properly support all piping installed on suitable pipe hangers and supports. Permanent hangers, supports, and anchors shall be fabricated from durable materials, hot dipped galvanized or stainless steel, suitable for service conditions in accordance with details on Drawings.
- C. Base required strength of all supporting equipment on combined weight of piping filled with water, plus any insulating covering.
- D. Install hangers for horizontal piping with following minimum rod sizes:

<u>Nominal Pipe Size</u>	<u>Minimum Rod Size</u>
0.75 in. to 2 in. pipe	0.375 in.
2.5 in. to 3.5 in. pipe	0.5 in.
4 in. to 5 in. pipe	0.625 in.
6 in. pipe	0.75 in.
8 in. to 12 in. pipe	0.875 in.

- E. Provide and install anchors in piping system to fix direction of expansion and contraction. Fabricate and assemble anchors to secure desired points of piping in relatively fixed positions. Hangers shall permit line to take up expansion and contraction freely in opposite directions away from anchored point and shall be so arranged as to be structurally suitable for particular location, line, and loading conditions in question.
- F. Use expansion anchors to anchor pipe hanger and supports where inserts have been improperly located, or where necessary to support piping from existing concrete construction. Provide expansion anchors equal to Ackerman-Johnson, Paine, Phillips, Hilti, ITW Ramset/Red Head, or Rawl. Expansion anchor locations must have approval of Engineer before installation. Coordinate location with structural.
- G. Support parallel pipe lines at same level on approved trapeze or saddle type hangers.
- H. Use steel rods to attach ring or trapeze hangers to building structure. Space hangers at sufficiently close intervals to support piping and its contents, 12 ft on center maximum for threaded pipes.

- I. Support copper piping with copper clevis hangers, or clevis hanger with copper supporting loop.
- J. Provide sheet metal collar at each pipe hanger for insulated pipe with vapor barrier.
- K. Any support hardware or material that is cut, scratched or treaded shall be coated with a zinc rich coating (ZRC or equivalent) at these locations.

3.6 CUTTING AND PATCHING

- A. General: Perform cutting and patching in accordance with Division 01 Section "Cutting and Patching". In addition to the requirements specified in Division 01, the following requirements apply:
 - 1. Protection of Installed Work: During cutting and patching operations, protect adjacent installations.
 - 2. Perform cutting, fitting, and patching of mechanical equipment and materials required to:
 - a. Uncover Work to provide for installation of improperly scheduled Work.
 - b. Remove and replace defective Work.
 - c. Remove and replace Work not conforming to requirements of the Contract Documents.
 - d. Remove samples of installed Work as specified for testing.
 - e. Install equipment and materials in structures.
 - f. Upon written instructions from the Engineer, uncover and restore Work to provide for Architect observation of concealed Work.
- B. Cut, remove and legally dispose of selected mechanical equipment, components, and materials as indicated, including but not limited to removal of mechanical piping, heating units, and trim, and other mechanical items made obsolete by the new Work.
 - 1. Protect the structure, furnishings, finishes, and adjacent materials not indicated or scheduled to be removed.
 - 2. Provide and maintain temporary partitions or dust barriers adequate to prevent the spread of dust and dirt to adjacent areas.
 - 3. Patch finished surfaces and building components using new materials specified for the original installation and experienced Installers. Installers' qualifications refer to the materials and methods required for the surface and building components being patched.
 - a. Refer to Division 01 Section "Reference Standards and Definitions" for definition of "experienced Installer".
 - 4. Respective trades will provide openings in floors, walls, and other members as required for installation of piping and equipment, provided that necessary information regarding such openings is furnished by contractor in timely manner.

5. If contractor fails to provide information regarding required openings, cutting and repairing of completed Work will be performed by respective trades at expense of contractor.
6. Seal all such openings in accordance with Division 07 Section "Joint Sealants."
7. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces necessary for mechanical installations only with written approval of Engineer. Perform cutting by skilled mechanics of the trades involved.
8. Repair cut surfaces to match adjacent surfaces.

3.7 LABELING AND IDENTIFYING

- A. Piping Systems: Install pipe markers on each system. Include arrows showing normal direction of flow.
 1. Stenciled Markers: Complying with ASME A13.1.
 2. Locate pipe markers wherever piping is exposed in finished spaces, machine rooms, accessible maintenance spaces (shafts, tunnels, plenums), and exposed exterior locations as follows:
 - a. Near each valve and control device.
 - b. Near each branch, excluding short take-offs for fixtures and terminal units. Mark each pipe at branch, where flow pattern is not obvious.
 - c. Near locations where pipes pass through walls, floors, ceilings, or enter inaccessible enclosures.
 - d. At access doors, manholes, and similar access points that permit view of concealed piping.
 - e. Near major equipment items and other points of origination and termination.
 - f. Spaced at a maximum of 50 ft (15m) intervals along each run. Reduce intervals to 25 ft (7.6 m) in congested areas of piping and equipment.
- B. Adjusting: Relocate identifying devices which become visually blocked by work of this Division or other Divisions.

3.8 PAINTING AND FINISHING

- A. Refer to Division 09 Section "Painting" for field painting requirements.
- B. Damage and Touch Up: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.9 CONCRETE BASES

- A. Construct concrete equipment bases of dimensions indicated, but not less than 4 in. (101 mm) larger than supported unit in both directions. Follow supported equipment manufacturer's setting templates for anchor bolt and tie locations. Use 3000-psi

(20.70MPa), 28-day compressive strength concrete and reinforcement as specified in Division 03 Section "Cast-in-Place Concrete".

3.10 TESTING AND GUARANTEE

A. Testing:

1. Take out all necessary permits, arrange for all required inspections, and pay all fees and expenses associated with performing Mechanical Work.
2. Test all piping systems at full operating pressure under normal conditions of use in accordance with requirements of Water Department, Board of Health, Fire Department, and all other authorities having jurisdiction. As a minimum, the water supply system shall be tested at 125 psi for 4 hrs, the sewer system at 5 psi for 15 minutes, natural gas at 100 psi for 2 hours, and the standpipe system at 225 psi for 2 hrs.
3. Provide all instruments for making tests.
4. Perform tests on following systems:
 - a. Water Supply System.
 - b. Sewer System.
 - c. Natural Gas Supply System.
 - d. Standpipe System.
5. Test all parts of system in presence of Contractor, Engineer, Owner and Authority having jurisdiction for sufficient period of time to permit complete examination and inspection.
6. Successfully test all concealed piping before its being permanently covered up.
7. Remedy all defects in materials or workmanship which appear during test or retest of system.

B. Guarantee:

1. In addition to any specific guarantee called for by Specifications, furnish to Owner written guarantee against defects in materials, workmanship for all apparatus and materials furnished, and for entire workmanship of installation for period of 1 yr from date of acceptance of Work.
2. During guarantee period and without expense to Owner, repair all defects in workmanship or material provided under this Section.

END OF SECTION 220500

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